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PROCEEDINGS

OF THE

ITERARY AND PHILOSOPHICAL SOCIETY

OF

LIVERPOOL,

DURING THE

FIFTY-NINTH SESSION, 1869-70.

No. XXIV.

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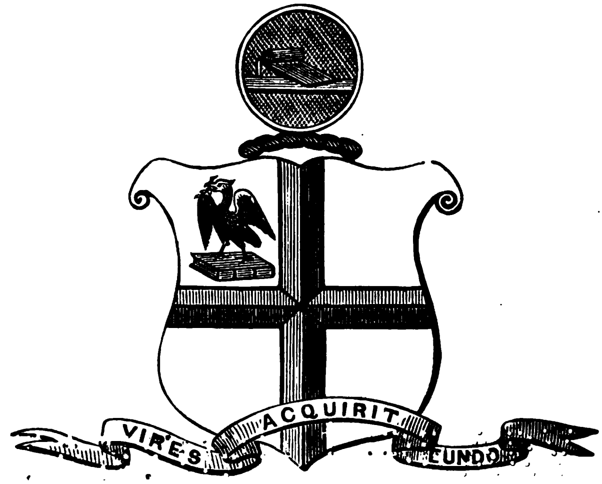

LONDON:
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1870.

This Volume has been edited by the Honorary Secretary.

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ON THE SOCIETY'S ROLL AT THE CLOSE OF THE 59TH SESSION.

CORRECTED TO OCTOBER, 1870.

Life Members are marked with an Asterisk.

Oct. 11, 1833	Aiken, James, 4, *Gambier-terrace.*
Nov. 4, 1867	Allen, John Fenwick, *Windleshaw, St. Helens.*
March 7, 1864	Archer, F., jun., B.A. Trin. Coll., Cantab., 3, *Brunswick Street.*
*Nov. 28, 1853	Archer, T. C., F.R.S.E., F.R.S.S.A., Director of the Industrial Museum, *Edinburgh.*
Dec. 14, 1863	Ashe, Theop. Fielding, *Atherton-street*, and *Moss Bank, Lodge-lane.*
Feb. 22, 1855	Avison, Thomas, F.S.A., 18, *Cook-street*, and *Fulwood Park, Aigburth.*
Jan. 11, 1864	Bagshaw, John, 87, *Church-street*, and *Canning-terrace*, 201, *Upper Parliament-street.*
May 1, 1854	Bahr, G. W., *Old Castle Buildings, South Castle-street*, and 2, *South-hill Grove, Aigburth.*
May 4, 1863	Bailey, Fras. J. M.R.C.S., 51, *Grove-street.*
Oct. 29, 1860	Banister, Rev. W., B.A., *St. James's Mount.*
Jan. 13, 1862	Bàruchson, Arnold, *Batavia Buildings, Hackins Hey*, and *Blundell-sands Great Crosby.*
Nov. 15, 1869	Beer, Joseph B. de (A. Baruchson & Co.), *Batavia Buildings, Hackins Hey.*
March 9, 1857	Bell, Christopher, *Redcross-street*, and 55, *Hamilton-square, Birkenhead.*
Dec. 10, 1866	Benas, Baron Louis, 5, *South Castle-street.*
Nov. 14, 1864	Bennett, J. M. *St. George's-place, Lime-street,* and 109, *Shaw-street*

Feb. 6, 1854	Bennett, William, *St. George's-place, Lime-street,* and *Heysham Tower, near Lancaster.*
Nov. 27, 1865	Biggs, Arthur Worthington, 15, *Tithebarn-street,* and 62, *Falkner-street.*
Nov. 18, 1867	Biggs, Russell H. W., 40, *Castle-street.*
Oct. 31, 1859	Birch, Jas., 12, *The Temple, Dale-street.*
Jan. 25, 1864	Birchall, James, Governor of the Liverpool *Industrial Schools, Kirkdale,* HON. SECRETARY.
April 15, 1861	Blake, James, 63, *Kitchen-street,* and 45, *Canning-street.*
March 9, 1866	Blood, William, *Chamber of Commerce.*
Nov. 26, 1866	Boult, Joseph, 15 D, *Exchange Buildings, West.*
*Mar. 6, 1835	Boult, Swinton, 1, *Dale-street,* and 71, *Bedford-street, South.*
Oct. 19, 1868	Bower, Anthony, *Vauxhall Foundry,* and *Bowersdale, Seaforth.*
Nov. 4, 1867	Bramwell, Ed., *Cowley Hill, St. Helens.*
March 7, 1870	Brandon, Thomas, *Parkfield, Aigburth-road.*
*Jan. 8, 1855	Brockholes, James Fitzherbert, *Puddington Old Hall, near Neston.*
Oct. 31, 1864	Bromham, William, 4, *India Buildings,* and 8, *Montpellier-terrace, Upper Parliament-street.*
Nov. 12, 1866	Brown, Edgar A., 86, *Bedford-street, South.*
Oct. 18, 1869	Brown, J. Campbell, D. Sc., F.C.S., 152, *Falkner-street.*
Feb. 4, 1867	Burden, Edward, 123, *Upper Parliament-street.*
April 18, 1864	Burne, Joseph, *Royal Insurance Office,* 1, *North John-street,* and *Higher Tranmere.*
Nov. 12, 1866	Butler, Rev. George, M.A. Oxon, *The College, Liverpool.*
*May 1, 1848	Byerley, Isaac, F.L.S., F.R.C.S., *Victoria-road, Seacombe.*
Feb. 23, 1868	Callon, W. J., M.D., 125, *Islington.*
Nov. 3, 1862	Cameron, John, M.D., M.R.C.P., Physician to the Southern Hospital, and Lecturer on Medicine at the Royal Infirmary Sch. of Med., 17, *Rodney-street.*
Jan. 25, 1869	Cape, John, (Norfolk, Cape & Co.,) 22, *North John-street.*

Jan. 9, 1865 Cariss, Astrup, 40, *Castle-street.*
Dec. 2, 1861 Chadburn, William, 71, *Lord-street.*
Dec. 1, 1851 Clare, John Leigh, H, *Exchange Buildings North,* and *Hoylake.*
Oct. 31, 1859 Clark, Charles H., 17, *North John-street,* and *Linden House, Rock Ferry.*
Dec. 10, 1866 Clay, Rev. Walter Lowe, *Parsonage, Rainhill.*
Jan. 26, 1863 Commins, Andrew, LL.D. Dub., *Eldon-chambers,* 20, *South John-street.*
Nov. 1, 1869 Cook, C. H. (Lamport & Holt,) *Drury Buildings,* 21, *Water-street,* and *Blundell Sands.*
Oct. 18, 1869 Cook, Henry Jas., *Byrom-street,* and *Burbo House, Blundell Sands.*
Oct. 6, 1863 Crosfield, Wm., jun., 28, *Temple-court,* and *Alexandra-drive, Ullett Road.*
Nov. 26, 1866 Curtis, Rev. F. H., M.A. Oxon, *The College, Shaw-street.*
Feb. 8, 1864 Cuthbert, J. R., 40, *Chapel-street,* and *White House Out-lane, Woolton.*
Dec. 14, 1868 Daley, Dennis, 28, *Brunswick-street.*
Jan. 24, 1870 Dallinger, Rev. W. H., *Greenfield Road, Old Swan.*
Nov. 12, 1866 Davies, E., F.C.S., *The Laboratory, Royal Institution, Colquitt-street.*
Nov. 2, 1863 Dawbarn, William, *The Temple, Dale Street,* and *Mosley-hill.*
Oct. 1, 1866 Dawson, Thomas, 26, *Rodney-street.*
March 9, 1868, Dixon, W., *Seacombe.*
Nov. 27, 1863 Dove, Jno. M., *Royal Insurance Office,* and *Claughton.*
Jan. 23, 1848 Drysdale, John James, M.D. Edin., M.R.C.S. Edin., 36, *Rodney-street.*
Oct. 5, 1863 Drysdale, W. G., 3, *Church-street, Egremont,* and *Regent-road.*
Feb. 4, 1856 Duckworth, Henry, F.L.S., F.R.G.S., F.G.S., 5, *Cook-street,* and 2, *Gambier-terrace,* VICE-PRESIDENT.
*Nov. 27, 1848 Edwards, John Baker, Ph.D. Gies., F.C.S., Messrs. Evans, Mercer & Co., 265, *Notre Dame-street, Montreal.*

March 21, 1870	Edwards, Edward, (Smith, Edwards & Co.,) *Adelaide Buildings*, 4, *Chapel-street.*
Oct. 29, 1866	Elliot, Adam, *Ashlea*, *Aigburth-road*, and 7, *Orange-court.*
Feb. 24, 1868	Elliot, John, 35, *Peter's-Lane.*
April 7, 1862	English, Charles J., 26, *Chapel-street*, and 26, *Falkner-square.*
Feb. 18, 1866	Fairclough, Rev. R. J., M.A. Cantab., 44, *Irvine-street, Edge-hill.*
*Dec. 13, 1852	Ferguson, William, F.L.S., F.G.S., 4, *South John-street*, and 2, *St. Aidan's-terrace, Birkenhead.*
Feb. 9, 1863	Finlay, William, Senior Mathematical Master, Middle School, *Liverpool College*, and 111, *Shaw-street.*
Oct. 1, 1866	Fletcher, Alfred E., F.C.S., H. M. Inspector of Alkali Works for the Western District; 21, *Overton-street, Edge-hill.*
Nov. 26, 1866	Flueck, Christian, 4, *Dingle-hill*, HON. LIBRARIAN.
*Mar. 19, 1855	Ford, James Thomas, 5, *Essex-ct., Temple, E.C.*
*Feb. 6, 1854	Gee, Robert, M.D. Heidelb., M.R.C.P., Lecturer on Diseases of Children, Royal Infirmary School of Med.; Physician, Workhouse Hospital; 5, *Abercromby-square.*
Feb. 20, 1865	Gordon, Rev. A., M.A., 49, *Upper Parliament-street.*
Dec. 2, 1861	Graves, Samuel R., M.P., *Baltic-buildings*, and *The Grange, Wavertree.*
Nov. 14, 1853	Greenwood, Henry, 32, *Castle-street*, and *Falkner-square.*
Jan. 22, 1855	Hakes, James, M.R.C.S., Surgeon to the Northern Hospital, 30, *Hope-street.*
Nov. 12, 1867	Halhead, W. B., 7, *Parkfield-road, Prince's Park.*
Feb. 23, 1863	Hall, Charlton R., 17, *Dale-street.*
Dec. 10, 1866	Hall, Hugh Fergie, (Charlton R. Hall & Co.) 17, *Dale-street*, and *Greenheys, Grove Road, Wallasey.*
*Jan. 21, 1856	Hardman, Lawrence, 35, *Rock Park, Rock Ferry.*
Nov. 15, 1869	Hartwig, Estevan H. L., 1, *Dale-street*, and 14, *Thackeray-street.*

Feb. 6, 1865	Hassan, Rev. E., *Alma-terrace*, *Sandown-lane.*
Nov. 13, 1865	Hayward, John Williams, M.D., 117, *Grove street.*
Feb. 6, 1865	Hebson, Douglas, 13, *Tower-chambers*, and 58, *Bedford-street*, *South.*
Dec. 28, 1846	Higgins, Rev. H. H., M.A. Cantab., F.C.P.S., *Rainhill*, Ex-PRESIDENT.
*Oct. 31, 1836	Higginson, Alfred, M.R.C.S., Surgeon Southern Hospital, 44, *Upper Parliament-street*, VICE-PRESIDENT.
Mar. 22, 1869	Higgin, Thomas, 33, *Tower-buildings.*
Nov. 16, 1863	Holden, Adam, 48, *Church-street*, and 2, *Carlton-terrace*, *Milton-road.*
March 9, 1868	Holme, James, jun., 109, *Mount Pleasant.*
*Dec. 14, 1862	Holt, Robert Durning, 6, *India-buildings*, and 29, *Edge-lane.*
*Nov. 13, 1854	Hunter, John, Member Hist. Society, Pennsylvania, *Halifax*, *Nova Scotia.*
Jan. 26, 1857	Hutton, David, 3, *St. George's-crescent*, and 61, *Canning-street.*
*April 29, 1850	Ihne, William, Ph. D. Bonn., *Villa Felseck*, *Heidelberg*, Ex-PRESIDENT.
Feb. 23, 1857	Imlach, Henry, M.D. Edin., 1, *Abercromby-square.*
*Oct. 21, 1844	Inman, Thomas, M.D. Lond., M.R.C.P., Physician Royal Infirmary, 12, *Rodney-street*, Ex-PRESIDENT.
Nov. 28, 1864	Jeffery, F. J., *Compton House*, and *Woolton Hall*, *Woolton.*
Feb. 8, 1869	Jeffery, J. R., *Compton House*, and *Woolton Hall*, *Woolton.*
Mar. 10, 1862	Johnson, Richard, *Queen Insurance Buildings*, and *Blundell Sands.*
Jan. 26, 1863	Johnson, Richard, jun., *Queen Insurance-buildings.*
Feb. 24, 1868	Jones, Charles W., *The Nook*, *Gateacre.*
Nov. 26, 1866	Jones, Edward, B.A., Head Master of Hibernian School.
*April 4, 1852	Jones, Morris Charles, F.S.A., F.S.A. Scot., 20, *Abercromby-square.*

May 5, 1851 Jones, Roger Lyon, *Liverpool and London-chambers, Exchange*, and 6, *Sunnyside, Prince's Park.*

Oct. 18, 1869 Jones, Wm. Bolton, 21, *South Castle-street.*

Oct. 2, 1865 Kendal, Robinson, 5, *Canning-street.*

Nov. 12, 1866 Kennedy-Moore, Rev. W., M.A., 151, *Canning-st.*

April 4, 1870 Kenion, Hubert, 2, *Blackburn-place, Hope-street.*

Nov. 15, 1869 Kent, W. K., (Thompson, Grindrod & Co.,) 7, *Cook-street.*

Nov. 15, 1869 King, Jos., 18, *Exchange Alley, W.*, and *Trelearen House, Blundell Sands.*

Nov. 1, 1869 Kinsman, W. N., 8, *Derwent-road, Stonycroft.*

Jan. 10, 1848 Lamport, William James, 21, *Water-street*, and *New Brighton.*

*Jan. 14, 1839 Lassell, William, F.R.SS. L. and E., F.R.A.S., 27, *Milton-street*, and 58, *Wapping.*

April 27, 1862 Lassell, William, jun., 27, *Milton-street*, and *Tuebrook.*

Oct. 21, 1844 Lear, John, 14, *Cook-street*, and 22, *Holland-terrace, Duke-street, Edge-hill.*

Dec. 10, 1860 Leyland, Joseph, *Williamson-square.*

Nov. 2, 1868 Lloyd, James, Vice-Consul, Argentine Confederation, 150, *Chatham-street.*

*Oct. 21, 1844 M'Andrew, Robert, F.R.S., F.L.S., *Isleworth House, Isleworth, London*, EX-PRESIDENT.

April 17, 1865 MacCheane, Wm., M.R.C.S., 47, *Shaw-street.*

March 9, 1857 MacFie, Robert Andrew, M.P., *Leith Offices, Moorfields*, and *Ashfield Hall, Neston, Cheshire.*

Oct. 4, 1869 Macalister, W. B., (National Steam Navigation Co., Water St.,) 18, *Alexandra Terrace, Princes-road.*

April 2, 1866 McMullen, Rev. James A., M.A., 106, *Exmouth-street, Birkenhead.*

April 20, 1863 Marples, David, 50B, *Lord-street*, and 33, *Euston-grove, Claughton.*

Feb. 24, 1868 Marsh, Jno., *Rann Lee, Rainhill.*

Jan. 21, 1839 Martin, Studley, 30, *Exchange*, and 109, *Bedford-street, South.*

Feb. 5, 1844 Mayer, Joseph, F.S.A., F.R.A.S., F.E.S., 68, *Lord-st.*, and *Pennant's House, Lower Bebington.*

*Oct. 21, 1867 Muspratt, E. K., *New Hall*, 41, *Old Hall-street*, and *Seaforth Hall, Seaforth.*

Oct. 31, 1859 Moore, Thomas John, Corr. Mem. Z.S., Curator Free Public Museum, *William Brown-street.*

Nov. 2, 1868 Moore, J. Murray, M.D. Edin., 6, *Oxford-street.*

Nov. 15, 1869 Morgan, Alfred, *Victoria Park, Wavertree.*

Jan. 8, 1855 Morton, George Highfield, F.G.S., 9, *London-road.*

April 16, 1849 Moss, Rev. John James, B.A., *Upton, Cheshire.*

Oct. 29, 1850 Mott, Albert Julius, *Church-street*, and *Sandfield, Waterloo*, HON. TREASURER.

April 3, 1854 Mott, Charles Grey, 27, *Argyle-street, Birkenhead*, and *Cavendish Road, Birkenhead Park.*

Nov. 27, 1865 Mountfield, William B., 12, *St. James's Road.*

Nov. 2, 1868 M‘Coskry, W., 14, *Cook-street.*

Mar. 21, 1870 M‘Quie, P. B., 12, *Preeson's-row*, and *Blundell Sands.*

Oct. 20, 1856 Nevins, John Birkbeck, M.D. Lond., M.R.C.S., Lecturer on Materia Medica, Royal Infirmary School of Medicine, 3, *Abercromby-square*, PRESIDENT.

April 7, 1862 Newlands, A., 5, *Brown's-buildings*, and 19, *Peel-terrace, Upper Canning-street.*

Feb. 6, 1865 Newton, John, M.R.C.S., 20, *Marmaduke-street, Edge-hill.*

*Nov. 29, 1847 Nisbet, William, F.L.P.S.G., *Church-st., Egremont.*

Nov. 2, 1868 Norrie, Rev. B. A. W., *Rainhill.*

*Oct. 15, 1855 North, Alfred, 20, *York Crescent, Clifton, Bristol.*

Nov. 18, 1861 Nugent, Rev. James, *Crosby.*

Dec. 10, 1866 Owen, Peter, (Farnworth & Jardine,) *Liverpool and London Chambers.*

Feb. 21, 1870 Packer, James Macnamara, M.D., *Rose Cottage, Poplar Bank, Huyton.*

Nov. 4, 1861 Philip, Thomas D., 49, *South Castle street*, and *Holly-road, Fairfield.*

Dec. 28, 1846 Picton, James Alanson, F.S.A., Chairman of the Library and Museum Committee, 11, *Dale-st.*, and *Sandy-knowe, Wavertree*, EX-PRESIDENT.

April 30, 1866 Praag, Rev. James, 35, *Mount-street.*

March 8, 1869 Parratt, Thos. P., 8, *Belvidere-road*, *Prince's-park.*

*Jan. 22, 1866 Raffles, William Winter, 54, *Brown's-buildings*, and *Sunnyside*, *Prince's Park.*

Nov. 12, 1860 Rathbone, Philip H., *Liverpool and London Chambers* (H), and *Greenbank-cottage*, *Wavertree.*

Mar. 24, 1862 Rathbone, Richard Reynolds, 11, *Rumford-street*, and *Beechwood House*, *Grassendale.*

*Jan. 7, 1856 Rawlins, Charles Edward, jun., 7, *Chapel-walks*, and 1, *Windermere-terrace*, *Prince's Park.*

*Nov. 17, 1851 Redish, Joseph Carter, 6, *Dingle-lane.*

Nov. 29, 1869 Roberts, Isaac, *Oak Villa*, *Rock-park*, *Rock Ferry.*

Feb. 4, 1867 Robinson, Joseph F., 9, *Orange-court.*

Oct. 4, 1869 Rogers, J. Frederick, (Dart & Rogers,) *The Temple*, *Dale-st.*, and 17, *Grove-park*, *Lodge-lane.*

Dec. 13, 1869 Roulston, Robt. W., 44, *Castle-street.*

April 18, 1854 Rowe, James, 16, *South Castle-street*, and 105, *Shaw-street.*

Feb. 20, 1865 Samuel, Albert H., (Evans, Son, & Co.,) *Wood-street*, and *Canning-terrace*, *Upper Parliament street.*

April 7, 1862 Samuel, Harry S., 11, *Orange-court*, and 2, *Canning-street.*

Mar. 19, 1866 Sephton, Rev. John, M.A., *Liverpool Institute.*

Nov. 2, 1868 Sharp, Charles, *Liverpool Institute.*

Nov. 16, 1863 Sheldon, E. M., M.R.C.S., 223, *Boundary-street.*

Oct. 29, 1866 Shimmin, Hugh, 56, *Cable-street*, and *Tue-brook*, *West Derby.*

Nov. 2, 1863 Skillicorn, John E., 7, *The Willows*, *Breck-road.*

Nov. 7, 1864 Skinner, Thomas, M.D. Edin., 1, *St. James's-road.*

*April 21, 1862 Smith, James, *Barkeley House*, *Seaforth*, and 7, *Water-street.*

Feb. 23, 1863 Smith, J. Simm, *Royal Insurance Office*, *North John-street.*

Dec. 10, 1866 Smith, Elisha, (Henry Nash & Co.) 5, *India-buildings.*

April 4, 1870 Smith, James, 11, *Lord-street.*

Feb. 24, 1862 Snape, Joseph, Lecturer on Dental Surgery, Royal Infirmary School of Medicine, 75, *Rodney-st.*

Nov. 12, 1860	Spence, Charles, 4, *Oldhall-street.*
Feb. 10, 1862	Spence, James, 18, *Brown's Buildings, Exchange,* and 10, *Abercromby-square.*
Nov. 27, 1865	Spola, Luigi, LL.D., 85, *Boundary-lane, West Derby-road.*
Nov. 29, 1869	Statham, H. H. jun., 5, *Batavia Buildings, Hackins Hey.*
Jan. 13, 1868	Stearn, C. H., 3, *Eldon-terrace, Rock Ferry.*
Dec. 14, 1857	Steele, Robert Topham, 4, *Water-street,* and *Wavertree.*
Jan. 9, 1865	Stewart, Robert E., L.D.S., R.C.S., Dental Surgeon Southern Hospital, and Liverpool Dental Hospital, 37, *Rodney-street.*
Oct. 18, 1858	Stuart, Richard, 11, *Manchester-buildings,* and *Brooklyn Villa, Breeze-hill, Walton.*
Dec. 13, 1869	Tate, Alexander Norman, 7, *Irwell Chambers, Fazakerley-street, Old Hall-street.*
*Feb. 19, 1855	Taylor, John Stopford, M.D. Aberd., F.R.G.S., 1, *Springfield, St. Anne-street.*
Jan. 23, 1843	Taylor, Robert Hibbert, M.D. Edin., L.R.C.S. Ed., Lect. on Ophthalmic Medicine, Royal Infirmary School of Medicine, 1, *Percy-street.*
Nov. 17, 1850	Tinling, Chas., 44, *Cable-street,* and 29, *Onslow Road, Elm Park.*
Dec. 1, 1851	Towson, John Thomas, F.R.G.S., Scientific Examiner Sailors' Home, 47, *Upper Parliament-street.*
Jan. 7, 1867	Trimble, Robt., *Cuckoo-lane, Little Woolton.*
*Feb. 19, 1844	Turnbull, James Muter, M.D. Edin., M.R.C.P., Physician Royal Infirmary, 86, *Rodney-street.*
Oct. 21, 1861	Unwin, William Andrew, 11, *Rumford-place.*
Oct. 21, 1844	Vose, James Richard White, M.D. Edin., F.R.C.P., Physician Royal Infirmary, 5, *Gambier-terrace.*
Mar. 18, 1861	Walker, Thomas Shadford, M.R.C.S., 82, *Rodney-street.*
Jan. 27, 1862	Walmsley, Gilbert G., 50, *Lord-street.*
Jan. 9, 1865	Walthew, William, *Phœnix Chambers,* and *Vine Cottage, Aughton.*
Dec. 13, 1869	Waterhouse, Harold, 37, *Catherine-street.*

April	4,	1870	Waugh, John, *Gas-works*, *Southport.*
Dec.	2,	1861	Weightman, William Henry, *Leith-offices*, *Moorfields*, and *Cambridge-road*, *Seaforth.*
April	7,	1862	Whittle, Ewing, M.D., Lecturer on Med. Jurisprudence, Royal Inf. School of Medicine, 77A, *Upper Parliament-street.*
Jan.	18,	1868	Whitworth, Rev. W. A., B.A., 185, *Islington.*
Mar.	18,	1861	Wood, Geo. S., 20, *Lord-street*, and *Bellevue-road*, *Wavertree.*

HONORARY MEMBERS,

LIMITED TO FIFTY.

1.—1819 John Stanley, M.D. Edin., *Whitehaven.*
2.—1827 Rev. William Hincks, F.R.S.E., F.L.S., Professor of Natural History in University College, *Toronto, C.W.*
3.—1833 The Right Hon. Dudley Ryder, Earl of Harrowby, K.G., D.C.L., F.R.S., *Sandon-hall, Staffordshire,* and 39, *Grosvenor-square, London, W.*
4.—1833 James Yates, M.A., F.R.S., F.L.S., F.G.S., &c., *Lauderdale House, Highgate, London.*
5.—1836 The Most Noble William, Duke of Devonshire, K.G., M.A., F.R.S., F.G.S., &c., Chancellor of the University of Cambridge, *Devonshire House, London, W.*, and *Chatsworth, Derbyshire.*
6.—1838 George Biddell Airy, M.A., D.C.L., F.R.S., Hon. F.R.S.E., Hon. M.R.I.A., V.P.R.A.S., F.C.P.S., &c., Astronomer Royal, *Royal Observatory, Greenwich.*
7.—1840 James Nasmyth, F.R.A.S., *Penshurst, Kent.*
8.—1840 Richard Duncan Mackintosh, L.R.C.P., *Exeter.*
9.—1841 Charles Bryce, M.D. Glasg., Fell.F.P.S.G., *Brighton.*
10.—1844 T. P. Hall, *Coggleshall, Essex.*
11.—1844 Peter Rylands, *Warrington.*
12.—1844 John Scouler, M.D., LL.D., F.L.S., *Glasgow.*
13.—1844 Thomas Rymer Jones, F.R.S., F.Z.S., F.L.S., Professor of Comparative Anatomy, *King's College, London.*
14.—1844 Robert Patterson, F.R.S., M.R.I.A., *Belfast.*
15.—1854 Sir Charles Lemon, Bart., M.A. Cantab., F.R.S., F.G.S., *Penrhyn, Cornwall.*
16.—1844 William Carpenter, M.D. Edin., F.R.S., F.L.S., F.G.S., Registrar, *London University.*
17.—1848 Rev. Thomas Corser, M.A., *Strand, Bury.*
18.—1850 Rev. St. Vincent Beechy, M.A. Cantab., *Worsley, near Eccles.*

19.—1851 James Smith, F.R.SS.L. and E., F.G.S., F.R.G.S., *Jordan-hill, Glasgow.*

20.—1851 Henry Clarke Pidgeon, *London.*

21.—1851 Rev. Robert Bickersteth Mayor, M.A., Fell. St. John's College, Cantab., F.C.P.S., *Rugby.*

22.—1852 William Reynolds, M.D., *Coed-du, Denbighshire.*

23.—1853 Rev. James Booth, LL.D., F.R.S., &c., *Stone, near Aylesbury.*

24.—1857 Thomas Jos. Hutchinson, F.R.G.S., F.R.S.L., F.E.S., H.B.M. Consul, *Rosario.*

25.—1861 Louis Agassiz, Professor of Natural History in Harvard University, *Cambridge, Massachusetts.*

26.—1861 Sir William Fairbarn, Bart., LL.D., C.E., F.R.S., *Polygon, near Manchester.*

27.—1861 Rev. Thomas P. Kirkman, M.A., F.R.S., *Croft Rectory, Warrington.*

28.—1862 The Right Rev. H. N. Staley, D.D., Bishop of Honolulu, *Sandwich Islands.*

29.—1863 Edward J. Reed, *Hyde Vale, Greenwich, S.E.*

30.—1865 John Edward Gray, Ph. D., F.R.S., &c., *British Museum.*

31.—1865 George Rolleston, M.D., F.R.S., Linacre Professor of Physiology in the University of Oxford, *Oxford.*

32.—1865 Cuthbert Collingwood, M.A. and M.B. Oxon, F.L.S.

33.—1867 J. W. Dawson, LL.D., F.R.S., F.G.S., &c., Principal and Vice-Chancellor of McGill University, *Montreal.*

34.—1868 Captain Sir James Anderson, *Atlantic Telegraph Company, London.*

CORRESPONDING MEMBERS.

LIMITED TO THIRTY-FIVE.

1.—1867 Albert C. L. G. Günther, M.A., M.D., Ph.D., British Museum, Editor of the "Zoological Record."
2.—1867 J. Yate Johnson, *London.*
3.—1867 R. B. N. Walker, *Gaboon, West Africa.*
4.—1868 Rev. J. Holding, M.A., F.R.G.S., *London.*
5.—1868 Geo. Hawkins, *Colombo, Ceylon.*
6.—1868 J. Lewis Ingram, *Bathurst, River Gambia.*
7.—1869 Geo. Mackenzie, *Cebu, Philippine Islands.*
8.—1870 Rev. Joshua Jones, D.C.L., King William's College, *Isle of Man.*

ASSOCIATES.

LIMITED TO TWENTY-FIVE.

1.—Jan. 27, 1862 Captain John H. Mortimer, "America," (Atlantic).
2.—Mar. 24, 1862 Captain P. C. Petrie, "City of London," Commodore of the Inman Line of American Steam Packets. (Atlantic.)
3.—Feb. 9, 1863 Captain James P. Anderson, R.M.S.S. "Africa," Cunard Service. (Atlantic.)
4.—Feb. 9, 1863 Captain John Carr, (Bushby and Edwards,) ship "Scindia." (Calcutta.)
5.—Feb. 9, 1863 Captain Charles E. Price, R.N.R., (L. Young and Co.,) ship "Cornwallis." (Calcutta and Sydney.)
6.—April 20, 1863 Captain Fred. E. Baker, ship "Niphon." (Chinese Seas.)

7.—Oct. 31, 1864 Captain Thompson, ship "Admiral Lyons." (Bombay.)

8.—Oct. 31, 1864 Captain Alexander Browne, (Papayanni,) S. S. "Agia Sofia." (Mediterranean.)

9.—Oct. 31, 1864 Captain Whiteway, ship "Annie Chesshyre." (Pacific.)

10.—April 13, 1865 Captain Alexander Cameron, (Boult, English, and Brandon,) ship "Staffordshire." (Shanghai.)

11.—Dec. 11, 1865 Captain Walker, ship "Trenton."

12.—Mar. 23, 1868 Captain David Scott.

13.—Oct. 5, 1868 Captain Cawne Warren.

14.—Oct. 5, 1868 Captain Perry.

15.—Mar. 22, 1869 Captain Robert Morgan, ship "Robin Hood."

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4.—1833 James Yates, M.A., F.R.S., F.L.S., F.G.S., &c., *Lauderdale House, Highgate, London.*
5.—1836 The Most Noble William, Duke of Devonshire, K.G., M.A., F.R.S., F.G.S., &c., Chancellor of the University of Cambridge, *Devonshire House, London, W.,* and *Chatsworth, Derbyshire.*
6.—1838 George Biddell Airy, M.A., D.C.L., F.R.S., Hon. F.R.S.E., Hon. M.R.I.A., V.P.R.A.S., F.C.P.S., &c., Astronomer Royal, *Royal Observatory, Greenwich.*
7.—1840 James Nasmyth, F.R.A.S., *Penshurst, Kent.*
8.—1840 Richard Duncan Mackintosh, L.R.C.P., *Exeter.*
9.—1841 Charles Bryce, M.D. Glasg., Fell.F.P.S.G., *Brighton.*
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11.—1844 Peter Rylands, *Warrington.*
12.—1844 John Scouler, M.D., LL.D., F.L.S., *Glasgow.*
13.—1844 Thomas Rymer Jones, F.R.S., F.Z.S., F.L.S., Professor of Comparative Anatomy, *King's College, London.*
14.—1844 Robert Patterson, F.R.S., M.R.I.A., *Belfast.*
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14.—Oct. 5, 1868 Captain Perry.

15.—Mar. 22, 1869 Captain Robert Morgan, ship "Robin Hood."

DONATIONS TO THE LIBRARY.

FIRST MEETING, 18th October, 1869.

Donations.	Donor.
Abolition of Patents; Recent Discussions in the United Kingdom and on the Continent	*Mr. Macfie.*
Memoirs of the Literary and Philosophical Society of Manchester, vol. 3, Third Series	*The Society.*
Proceedings of the Literary and Philosophical Society of Manchester, vols. 5, 6, 7	*The Society.*
Transactions of the Historic Society of Lancashire and Cheshire, vol. 8, 1867–68	*The Society.*
Journal of the Royal Asiatic Society, vol. 4, part 1 (Trübner)	*The Society.*
Proceedings of the Scientific Meetings of the Zoological Society, London, 1868, part 3, June and December	*The Society.*
Journal of the Royal Geographical Society, vol. 29	*The Society.*
Journal of the Society of Arts, nos. 858 to 881, inclusive	*The Society.*
Report of the British Association, 1868, Norwich	*Dr. Inman.*
Ancient Faiths Embodied in Ancient Names, vol. 2, by Dr. Inman	*The Author.*
Proceedings of the American Philosophical Society, vol. 2, no. 81 (Philadelphia)	*The Society.*
Abstract of the Proceedings of the Liverpool Geological Society, 1868–69	*The Society.*
Journal of the Chemical Society, May to September, 1869	*The Society.*
Canadian Journal (Toronto, Canadian Institute)	*The Institute.*

Thirty-sixth Annual Report, Royal Cornwall Polytechnic Society, 1868 (Falmouth)	*The Society.*
Journal of the Statistical Society of London, June, 1869–September, 1869	*The Society.*
Proceedings of the Royal Geological Society, vol. 13, nos. 2, 3, 4	*The Society.*
Proceedings of the Meteorological Society, vol. 4, nos. 42, 43, 44	*The Society.*
Proceedings of the Royal Society, vol. 17, nos. 111, 112, 113	*The Society.*
Monthly Notices of the Royal Astronomical Society, vol. 29, nos. 6, 7, 8	*The Society.*
Anthropological Review, July to October, 1869	*The Society.*
Journal of the East India Association, 55, Parliament Street, vol. 3, no. 2	*The Society.*
Journal Linnæan Society, vol. 10, no. 46, Zoology; vol. 11, nos. 50 and 51, Botany	*The Society.*
Proceedings of the Liverpool Philomathic Society, 1868–69	*The Society.*
Annual Report of the Trustees of the Museum of Comparative Zoology, at Harvard College, 1868, Boston	*The Trustees.*
Journal of the Franklin Institute, for March, April, June, July, 1869	*The Institute.*
Hull Royal Institution Report, and Proceedings of the Hull Literary and Philosophical Society, 1869	*The Society.*
Journal of the Scottish Meteorological Society, for April and July, 1869	*The Society.*
Proceedings of the Liverpool Architectural and Archæological Society	*The Society.*
Journals of the Liverpool Polytechnic Society	*The Society.*
Proceedings of the Zoological Society (London), 1869, January to March	*The Society.*
Canadian Naturalist and Geologist, June to December, 1868	*The Society.*

SECOND MEETING, 1st November, 1869.

Journal of the Society of Arts, nos. 882–884	*The Society.*
Greenwich Observations, 1867	*The Observatory.*
Proceedings of the Royal Institution of Great Britain, vol. 5, parts 5 and 6	*The Institution.*
List of Members, and Report of ditto, 1868–69	*The Institution.*
Journal of the Chemical Society, October	*The Society.*
Proceedings of the Royal Society, vol. 18, no. 144	*The Society.*
Monthly Notices, Royal Astronomical Society, vol. 29, no. 9	*The Society.*
Journal of the Royal Dublin Society, no. 38	*The Society.*
Smithsonian Report, 1867	*The Institute.*
Catalogue of the Orthoptera of North America (Smithsonian Collection)	*The Institute.*
Report of the National Academy of Sciences at Washington	*The Academy.*
Journal of the Franklin Institute, August	*The Institute.*
Forty-ninth Annual Report of the Board of Controllers of Public Schools, First School District, Pennsylvania, 1867	*The Board.*
Proceedings of the Essex Institute, Salem, vol. 5, nos. 7, 8	*The Institute.*
Annals of the Lyceum of Natural History of New York, April	*The Lyceum.*
Proceedings of the American Society at Philadelphia, vol. 10, nos. 78, 79	*The Society.*
Proceedings of the American Academy of Arts and Sciences, conclusion of vol. 7	*The Academy.*
Proceedings of the Boston Society of Natural History, first part of vol. 12	*The Society.*
Occasional Papers of ditto (Harris' Entomological Correspondence)	*The Society.*
Memoirs of ditto, vol. 1, part 4	*The Society.*

Reale Instituto Lombardo di Scienze e Lettre, Rendiconti, vol. 1, nos. 1–20; vol. 2, nos. 1–10	*The Institute.*
Solenni Adunanze del R. Instituto, vols. 1–5	*The Institute.*
Memorie ditto, vol. 11	*The Institute.*

THIRD MEETING, 15th November, 1869.

Proceedings of the Linnæan Society of London, Session 1868–69	*The Society.*
Proceedings, Liverpool Chatham Society, Architectural and Archæological Society, and Polytechnic Society	*The Societies.*
Essay on Hydro-fluoric Acid, by G. Gore, F.R.S., Birmingham	*The Author.*
Journal of the Royal Geological Society of Ireland, vol. 12, part 2	*The Society.*
Seventeenth Annual Report of the Public Free Libraries of Manchester	*The Mayor and Corporation.*
Journal of the Society of Arts, nos. 885, 886	*The Society.*
Annual Report of the Leeds Philosophical and Literary Society, 1868–69	*The Society.*

FOURTH MEETING, 29th November, 1869.

Annual Report and Transactions of the Plymouth Institution, and Devon and Cornwall Natural Historic Society, vol. 3, part 2, 1868–69	*The Institution.*
Journal of the Society of Arts, 886–887	*The Society.*

Clinical Society's Transactions, vol. 2	*The Society.*
Journal of the Chemical Society, November, 1869	*The Society.*
Liverpool Medical and Surgical Reports, October, 1869	*The Editors.*
Clark's Ante-Nicene Library:	
The Writings of Methodius, &c.	*Mr. Macfie.*
Works of Tertullian, vol. 1	*Mr. Macfie.*
Clement of Alexandria, vol. 2	*Mr. Macfie.*
Writings of Cyprian, vol. 2	*Mr. Macfie.*

FIFTH MEETING, 13th December, 1869.

Journal of the Franklin Institute, September and October, 1869	*The Institute.*
Proceedings of the Royal Geographical Society, vol. 13, no. 5	*The Society.*
Memorie del Reale Instituto Lombardo, vol 11	*The Institute.*
Ditto Rendiconti, vol. 2, parts 2, 16	*The Institute.*
Hongl. Vetenskaps Akademien Stockholm-Handlingar Ny följd, bd. 1865–67	*The Academy.*
Hongl. Ofversight, bd. 1865–68	*The Academy.*
Lefnadsteckningar, vol. 1, part 1	*The Academy.*
Nordenskiöld's Sketch of the Geology of Spitzbergen	*The Author.*
Igelström's Rock of Nullaberg	*The Author.*
Lindström's Gotlands Mollusker	*The Author.*

SIXTH MEETING, 10th January, 1870.

Journal of the Scottish Meteorological Society, October	*The Society.*

Journal of the Chemical Society, December	*The Society.*
Journal of the Society of Arts, nos. 889–893	*The Society.*
Canadian Journal of Industry, &c., November	*Canadian Institute.*
Proceedings of the Royal Society, vol. 18, no. 115	*The Society.*
Monthly Notices of the Royal Astronomical Society, vol. 3, no. 1	*The Society.*
Seventeenth Report of the Liverpool Free Library, &c.	*Mayor and Corporation.*
Journal of the Liverpool Polytechnic Society	*The Society.*

EIGHTH MEETING, 7th February, 1870.

Journal of the Chemical Society, January	*The Society.*
Proceedings of the Meteorological Society, vol. 5, no. 45	*The Society.*
Journal of the Society of Arts, nos. 894–896	*The Society.*
Journal of the Statistical Society, December	*The Society.*
Monthly Notices of the Royal Astronomical Society	*The Society.*
Transactions of the Royal Scottish Society of Arts, vol. 8, part 1	*The Society.*
Transactions of the Liverpool Chemists' Association, 1868 and 1869	*The Association.*
Fra Det Hongelige Norske Universitet i Christiania ved Universitetets Secretaire	*The University.*
Forslag til en forandret Ordning af det Hoire	*The University.*
Skolevœsen, 1867. Anden del	*The University.*
Skolevœsen, 1867. Tredie del	*The University.*
Ungedruckte und wenig beachtete Quellen zur Geschichte des Taufsymbols und der Glaubensregel, von Dr. C. P. Caspari	*The University.*
Det Hongelige Norske Frederiks Universitets, 1868	*The University.*
Norkinskinna-Pergamentsbog fra forste Halvdel af det Trettende Aarhundrede. C. R. Unger.	*The University.*

La Glacier de Boium, par S. A. Sesxe, July, 1868	*The University.*
Proceedings of the Society of Antiquaries, London, vol. 4, nos. 3, 4, 5 and 6	*The Society.*
Journal of the Linnæan Society, December and January	*The Society.*
Proceedings of the Linnæan Society, November	*The Society.*

TENTH MEETING, 7TH MARCH, 1870.

Journal of the Society of Arts, nos. 897–901	*The Society.*
Transactions of the Edinburgh Geological Society, vol. 1, part 3	*The Society.*
Second Radcliffe Catalogue of Stars for 1860	*Radcliffe Trustees, Oxford.*
Proceedings of the Royal Society, vol. 18, no. 116	*The Society.*
Journal of the Franklin Institute, November and December, 1869	*The Institute.*
Proceedings of the Meteorological Society, vol. 5, no. 46	*The Society.*
Microscopic Objects, no. 1	*Mr. Van Voorst.*
Monthly Notices of the Royal Astronomical Society, vol. 30, no. 3	*The Society.*
Proceedings of the Liverpool Architectural and Archæological Society, December and January	*The Society.*
Forty-fifth Report Liverpool Institute	*The Directors.*
Memoire sur la Subsaturation par M. Lecoq de Boisbaudran	*Mr. Unwin.*

ELEVENTH MEETING, 21ST MARCH, 1870.

Journal of the Society of Arts, nos. 902, 903	*The Society.*

Journal of the Chemical Society, February	*The Society.*
Proceedings of the Royal Society of Edinburgh, 1868 and 1869	*The Society.*
Anthropological Memoirs, vol. 3	*The Society.*
Memoir of Charles Wye Williams, M. Institute C.E., Excerpt from Annual Report of Civil Engineers	*Rev. W. Banister.*

TWELFTH MEETING, 4th April, 1870.

Journal of the Society of Arts, 903–905	*The Society.*
Journal of the Chemical Society, March	*The Society.*
Proceedings of the Royal Geographical Society, vol. 14, no 1	*The Society.*
Journal of the Royal Asiatic Society, vol. 4, part 2	*The Society.*
Monthly Notices of the Royal Astronomical Society, vol. 30, no. 4	*The Society.*
Proceedings of the Royal Society, vol. 18, no. 117	*The Society.*
Journal of the Scottish Meteorological Society, no. 25	*The Society.*

TREASURER'S ACCOUNT, 1868-69.

Dr. *The Literary and Philosophical Society, in Account with* Albert J. Mott, *Treasurer, to October*, 1869. **Cr.**

	£	s.	d.
To paid Mr. Marples, for Printing	96	13	3
„ Mr. Tinling, for Printing and Stationery	12	11	0
„ Secretary's Expenses, postage, &c.	10	6	6
„ „ Editorial Fee	10	10	0
„ Mrs. Johnson, for Tea, Coffee, &c.	23	3	10
„ Delegates to British Association	15	0	0
„ Testimonial presented to Charles Dickens	15	15	0
„ Annual Dinner, balance over receipts	4	18	6
„ Collector's Commission	8	1	6
„ Waiters' Attendance	2	12	6
„ Roskell & Co. 6/6, Longman & Co. 1/9	0	8	3
	200	0	4
Balance carried down	316	9	7
	£516	9	11

				£	s.	d.
By Balance from last Account—						
Dock Bonds	£250	0	0			
In Treasurer's hands	58	17	6			
				308	17	6
„ 10 Entrance Fees				5	5	0
„ 158 Annual Subscriptions				165	18	0
„ 2 Half ditto				1	1	
23 Arrears				24	3	0
„ Interest upon Dock Bonds, less Income Tax				11	5	5
				£516	9	11
Balance brought down—						
Dock Bonds	£250	0	0			
In Treasurer's hands	66	9	7			
	£316	9	7			

Errors excepted.

Audited and found correct, { C. FLUECK.
E. DAVIES.

PROCEEDINGS

OF THE

LIVERPOOL

LITERARY AND PHILOSOPHICAL SOCIETY.

ANNUAL MEETING—FIFTY-NINTH SESSION.

ROYAL INSTITUTION, 4TH OCTOBER, 1869.

JOHN BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

The new President was formally installed in his office by the retiring President (the Rev. Dr. Ginsburg), with a few brief congratulatory observations.

The minutes of the last meeting were then read and confirmed, after which

The HONORARY SECRETARY read the following

REPORT.

The fifty-eighth report, which the Council of the Literary and Philosophical Society now present to the Members, is a record of the continuation of that success which has uniformly attended the Society's proceedings for many years past.

The value and character of the papers contained in the volume of Proceedings, which will shortly be published, fully maintain the standing and reputation of the Society; and as some of these are by authors whose names have not previously appeared in this capacity in the Society's publications, the Council feel they are justified in congratulating the Members upon so good a sign of continued health and vigour. The attendance of Members at the meetings has also been large, and the discussions which followed have been spirited and able.

The number of Ordinary Members on the Society's roll has been slightly reduced, but is considerably above the average for the last seven years. There are two hundred names in this class; at the close of last session there were two hundred and seven; the number withdrawn was twenty; that of new names added, thirteen.

Four names will be found removed from the list of Honorary Members—those of W. Ewart, M. P., Geo. Patten, A. R. A., the Rev. Brook Aspland, A. R. A., and Professor Jukes, who are deceased. Another Honorary Member also has died since the list was printed off, Professor Roget, who was the only original Member remaining on the Society's roll. One Honorary Member's name has been added under circumstances of special distinction — that of Charles Dickens. The Society thus contains thirty-five Honorary Members.

The class of Corresponding Members, being of recent origin, is still small, but it is that department by which the Society is best enabled to obtain direct information in natural and geographical science from explorers themselves, and to maintain intercourse with scientific men.

One of the most efficient departments of the Society is the class of Associates, to whom the Members are in a great measure indebted for the numerous specimens of marine zoology which have been exhibited at the meetings of the past session. This class contains sixteen names.

From this brief review of the various sections of the Society, it will be seen that the Council have ample ground for the opinions they have now expressed regarding the present position of this Society. They have, however, an additional cause for congratulation, in the fact that, owing to the united efforts of this and the kindred societies, together with the interest of the Mayor and Town Council, the British Association has at length determined to hold its next annual meeting in Liverpool. This event will doubtless confer many material benefits upon the Society, and add fresh impulse to the vigour of its exertions; and your Council feel assured that the Officers and Members will relax none of their energies to render the Meeting an honour to the town, and worthy of such a distinguished scientific body. On the last occasion when the Association met in Liverpool, viz., in 1854, this Society voted £50 to the funds of the Local Committee, and they now recommend a repetition of the gift. A revised copy of the laws has been printed, and will be placed in the hands of the Members with the distribution of the new volume. Three of the alterations made will contribute very materially to the Society's efficiency: the library will become more available to the Members by the appointment of a Librarian; the proceedings of the annual meeting will derive additional interest from the President's inaugural address; and the difficulty so often felt in the election of Members of Council will be removed by the enlargement of the managing body.

The change made last session in the time of holding the annual dinner was found so acceptable, that the Council recommend its celebration again under the same circumstances.

In conclusion, the Council now recommend the following five gentlemen for election on the new Council, according to the 41st Law:—Rev. W. Banister, B. A., James Birch, Rev. A. Gordon, M.A., J. C. Redish, Rev. J. Sephton, M.A.

It was then moved by Mr. J. C. Redish, and seconded by the Rev. E. Hassan, that the Report now read be received and adopted by the Society, which was carried unanimously.

Referring to the proposed grant of funds in this Report, it was then moved by Mr. Redish, seconded by Mr. Arnold Baruchson, and carried unanimously—"That the Treasurer be authorised to pay £50 out of the funds of this Society, as a contribution towards the entertainment of the British Association, at their next annual meeting, to be held in Liverpool."

Mr. A. J. Mott, the Honorary Treasurer, was next called upon to read the annual statement of accounts, which had been duly audited by Messrs. Davies and Flück. This statement was approved of, and passed unanimously, on the motion of the Rev. H. H. Higgins, seconded by Mr. A. E. Fletcher.

The Society next proceeded to the election of the office-bearers for the ensuing year, when the following gentlemen were duly appointed.

Vice-Presidents:

Mr. Alfred Higginson, M. R. C. S.,
Mr. Arnold Baruchson,
Mr. Henry Duckworth.

Hon. Treasurer:

Mr. Albert J. Mott.

Hon. Secretary:

Mr. James Birchall.

Hon. Librarian:

Mr. Christian Flueck.

Members of Council:

Rev. W. Banister, B. A.,
Mr. James Birch,
Rev. A. Gordon, M. A.,
Mr. Joseph Carter Redish,
Rev. J. Sephton, M. A.,
Rev. W. Kennedy-Moore, M. A.,
Rev. Walter Lowe Clay, M. A.,
Mr. Thos. J. Moore, *Corresponding Member Z. S.*,
Mr. Alfred E. Fletcher, F. C. S.
Mr. G. H. Morton, F. G. S.
Mr. Edward Davies, F. C. S.,
Dr. Whittle,
Mr. Richard Johnson,
Mr. Jos. F. Robinson.

The names of the Associates were then read over by the Secretary, when they were all declared duly re-elected.

A communication from the Council was next read, recommending the election of Professors Dr. Reihm and Dr. Schlottman, of the University of Hallé, as Honorary Members.

The following gentlemen were elected Ordinary Members: Mr. W. B. Macalister, and Mr. J. Frederick Rogers.

Mr. T. J. Moore exhibited the following objects from the Free Public Museum:—A collection of fish from the Bay of Yeddo, Japan. Of these fish, specimens of the Angler (*Lophius*), Gurnard, and others, were northern species or genera included in the British fauna, and specimens of the Box fish (*Ostracion*), and others, showed the intermixture of tropical forms. Also a large series of marine specimens dredged in the South China Seas, between 106° and 107° E., and 4° to 6° S., in April last. Among these were particularly pointed out a very handsome red coraline, attached to the rock as it grew; a very large and fine *Alcyonium*, and some rare Sea Urchins. The last named objects had been examined by Mr. Alexander Agassiz, during a recent visit to Liverpool, and were referred by him to the genus *Maretia*. The above formed a part only of a collection made during a voyage to Japan, by Captain Cawne Warren, of the barque *Brilliant*, a newly-elected Associate of the Society, who had preserved and presented careful notes of the latitude and longitude, and other particulars, of the capture of the specimens; and had also kept a meteorological register during his voyage, after the plan recommended by the late Admiral Fitzroy, and had forwarded it to the Board of Trade. Mr. Moore also exhibited two birds, and a vertebra of a large fish, collected in Palestine by Mr. A. M. Sandbach, and presented by him to the Museum. The birds were a specimen of the Common Roller (*Coracias garrula*, Linn.) from the Jordan Valley, between Tiberias and Abu Obeideh, and a Kingfisher (*Alcyon Smyrnensis*, Linn.) from near Bethsaida, both shot during April last. The fish vertebra was picked up by Mr. Sandbach, on the north shore of the Dead Sea, about the same time; had several *Lepralia*-like incrustations, &c., upon it; was much heavier than ordinary recent fish bones, and equalled in size some of the vertebræ from a British specimen of the Maigre (*Sciæna aquila*, 4 ft. 10 in. in length), and to which it bore considerable resemblance.

Mr. J. Macgregor (so widely known for his travels, particularly on the waters of Palestine) was present at the meeting, and stated that no fish of the size indicated by this specimen had come under his observation during his recent explorations in Palestine.

The President then delivered the following Inaugural Address:

INAUGURAL ADDRESS.

Gentlemen, — In selecting a subject for the Inaugural Address at the commencement of this Session, I believe that I shall most satisfactorily meet your wishes by giving a short sketch of those features of the Meeting of the British Association in Exeter, which appeared the most interesting or novel; and as the attendance of our Society's Members was very limited, owing to our great distance from Exeter, I trust that a short account of the meeting may not prove entirely a twice-told tale, to all whom I have now the pleasure of addressing, for the first time, from the position of honour in which your kindness has placed me.

With respect to the proceedings generally, my impression is, that, although in some of the sections the papers may have been somewhat less interesting than usual, the meeting will be remembered as having given the first authoritative check to the stream in which philosophical teaching has lately flowed; and that the language of the President, guarded and moderate as it was, will enable minor, but still independent thinkers to maintain with less hesitation, lest they should be thought entirely ignorant of philosophy, their convictions that man is something more than a mechanical machine; and that life, free will and responsibility have an existence and power beyond the mere properties and movements of matter. This, it appears to me, has been the characteristic feature of the recent meeting; and by this general impression, rather than by the special papers read, will the meeting have done its work in promoting the great cause of truth,—and, if of truth, then of science in its highest and most worthy acceptation.

In the Geographical Section, there was less than the usual interest, from the lack of any important discoveries, and the absence of travellers of either established or of rising reputation; and I believe that the papers generally in the Geological Section also were of limited interest and importance. The only sections in which it could be said that much animation or active interest was excited, were the Biological and the Economic Sections. The room of the first was filled to overflowing, many members being unable to gain entrance even to its porch, on the day which was announced for several papers in opposition to Darwin's views; and also on the following day, when Sir J. Lubbock was to read a paper on the primitive condition of man. In the Economic Section, also, when papers were read on the condition and education of the agricultural labouring class, the room was well filled; and the animation—and perhaps it might almost be said the acrimony—of some parts of the discussion, showed how much more deeply the mind and feelings even of philosophers, and of the British Association, are stirred by what relates to the present and past condition of human kind, to its antecedents and to its future, than by the most abstruse discoveries in what relates only to matter; to what is wanting in that which we must still call *life*, in spite of the teaching of some modern philosophers, however eminent, "that life is only a series of vibrations amongst the particles of matter."

There was nothing more striking, during the delivery of the President's address, than the wonderful simultaneous start to interest throughout the audience, when he came to the following words, evidently relating to what had been recently said at Norwich and Edinburgh, ushered in by a slight but perceptible change in his voice, and uttered in a manner that showed a consciousness of their possessing an importance which he did not attribute to some other portions of the address:—

"With reference to those branches of science in which we are more or less concerned with the phenomena of life, my own studies give me no right to address you. But I hope I may be permitted, as a physicist, and viewing the question from the physical side, to express to you my views as to the relation which the physical bears to the biological science.

"In Mechanics, we have long been familiar with the perfect generality of its laws, and of their applicability to bodies organic as well as inorganic, living as well as dead; so that, in a railway collision, the passengers are thrown forward by virtue of the *vis inertiæ* of their bodies, precisely according to the laws which regulate the motion of dead matter. So trite has the idea become that reference to it may seem childish. But from Mechanics let us pass on to Chemistry, and the case will be found by no means so clear. When chemists ceased to be content with the mere ultimate analysis of organic substances, and set themselves to study their proximate constituents, a great number of definite chemical compounds were obtained, which could not be formed artificially, and were thought to be essentially connected with life. But, as the science progressed, many of the organic substances were formed artificially; in some cases from other organic substances, but in other cases actually from their elements; and we may say that at the present time a considerable number of what used to be regarded as essentially natural organic substances have been formed in the laboratory. That being the case, it seems most reasonable to suppose that in the plant or animal from which these organic substances were obtained they were formed by the play of ordinary chemical affinity.

"But do the laws of chemical affinity, to which, as well as to mechanical laws, living beings are in subjection, account for the *formation* of an organic being, as distinguished from the elaboration of the chemical substances of which it is composed? No more, it seems to me, than the laws of motion account for the union of oxygen and hydrógen to form water. In the various processes of crystallisation, and so forth, which we witness in dead matter, I cannot see the faintest shadow of an approach to the formation of an organic structure, still less to the wonderful series of changes which are concerned in the growth and perpetuation of even the lowliest plant. Admitting to the full, as highly probable, though not completely demonstrated, the applicability to living beings of the laws which have been ascertained with reference to dead matter, I feel constrained, at the same time, to admit the existence of a mysterious *something* lying beyond; a something—*sui generis*—which I regard not as balancing or suspending the ordinary physical laws, but as working with them and through them to the attainment of a designed end.

"What this mysterious *something* may be, is a profound mystery. We know not how many links in the chain of secondary causation may yet remain behind. We know not how few. It would be presumptuous indeed to assume in any case that we have already reached the last link, or to charge with irreverence a fellow-worker who attempted to push his investigation yet one step further back. But, on the other hand, if a thick darkness enshrouds all beyond, we have no right to assume that it is impossible we may have reached the last link in the chain—a stage when further progress is unattainable; and we can only refer the highest law at which we stopped to the fiat of an Almighty power. Let us fearlessly trace the dependence of link on link as far as it may be given us to trace it; but let us take heed that in the studying second causes we forget not the First Cause, nor shut our eyes to the wonderful proofs of design which, in the study of organised beings especially, meet us at every turn."

During many parts of the address, it was easy to observe wandering eyes, and distracted attention; but during the reading of these sentences there was the most absorbed attention; and the subdued applause which followed them implied, as far as we could judge from its character, that the President's remarks had struck a responsive chord in the minds of his hearers; who, however, felt the subject, and the inferences connected with it, too serious for the spontaneous and hearty applause that greets a brilliant experiment, or a sentiment which delights without appealing to the deeper recesses of the heart.

We have just heard the sentiments of one of the greatest masters of mathematical science of the present day; and I wish now to lay before you the expressions of an experimental chemist, whose name, Dumas, needs only to be mentioned, to bring before us the image of one of the most accomplished pioneers in organic chemistry, and one who has a right to speak on behalf of chemists, which the President of the British Association had declared his own inability to do.

In delivering the "Faraday Lecture," in the Royal Institution, in London, last June, Dumas says (*Chemical News*, July 2, 1869), "The chemist is no longer obliged to derive all so-called organic substances from those yielded by animals and vegetables; he creates them now at will, and by the necessary artifices succeeds in forming all the definite compounds of organic chemistry. But, if I ask the physiologist on the subject of these innumerable compounds, misnamed 'organic,' which the chemist transfers or reproduces at his pleasure, 'Are these compounds living?' he will reply 'No!' 'Have they lived, or are they capable of living?' 'No!' And if I ask the chemist himself, if these compounds belong to the chemistry of inanimate ("*brut*") substances, he will reply, 'Yes!' Sugar and alcohol, and other organic products, have no more share in life than bone-earth, or the salts contained in the various liquids. Chemistry may, indeed, produce them, in the same sense in which she manufactures sulphuric acid or soda, without, for all that, having penetrated into the sanctuary of life. This subject remains where it was, inaccessible, closed. Life is still the continuation of life. Its origin is hidden from us as well as its end. We have never witnessed the beginning of life, we have never seen how it terminates; and the chemist has never manufactured anything which, near or distant, was susceptible even of the appearance of life. Everything he has made in his laboratory belongs to inanimate matter. As soon as he approaches life and organization he is powerless."

When, therefore, we are told, as we were at Norwich, that "if we place corn in the earth, and subject it to a certain degree of warmth (in other words, to tremulous molecular motion), the grain and the substances surrounding it interact, and a bud is formed, which reaches the surface, where it is exposed to the sun's rays, which are also to be regarded as a kind of vibratory motion, and then we have in succession the stalk and the full corn in the ear; and, given the grain and its environments, an intellect sufficiently expanded might trace out, *a priori*, every step of the process, and by the application of *mechanical* principles would be able to demonstrate that the cycle of actions must end in the reproduction of forms like that with which the operation began." When, I say, we are told this, the chemist replies, that chemical forces alone have never been able to produce even the semblance of life; and the great mathematician and physicist who now fills the presidential chair of the British Association, tells us "that, in addition to all those laws which apply to dead matter, he is constrained to admit the existence of a mysterious something—*sui generis*—lying beyond; not suspending the ordinary physical laws, but working through them, to produce the wonderful series of changes which are concerned in the growth and perpetuation of even the lowest of living beings." This mysterious something—*sui generis*—it is which, when associated with the protoplasm in the spermatic secretion of man, or the human ovum, causes that it shall differ so utterly in its powers from protoplasm from every other known source, that it shall assimilate all other forms of protoplasm, and slowly convert them into a thinking, responsible being, whose visible personality shall last about seventy years; whilst this mysterious something—still *sui generis*—when associated with other protoplasm, shall cause it to produce an irresponsible winged creature, which lasts for a day.

When associated with the protoplasm of the rock rose, it shall cause it to bud in a night, and blossom for a single day; whilst, associated with that of the oak, it shall cause it to increase for centuries, and yet terminate its individual existence at last, with as much certainty as that of the shorter lived beings whom we have passed in review. This same something, *sui generis* also, if associated with the corn, will enable the various molecular vibrations (warmth and light, and chemical affinity), which are dwelt upon by Professor Tyndall, to produce the changes that are observed in the growth of the grain; whilst, without its presence, the stoutest advocate of molecular vibration is as well aware as the most old-fashioned naturalist, that heat and moisture, light and electricity, and every other known modification of force, might act singly or combined for ever, without our seeing either the sprout, the blade, or the full corn in the ear. It is no answer to these proofs of a force which manifests its power at least as strikingly and as characteristically as light, or electricity, or any other mode of molecular vibration, to say that the protoplasm of grass can be converted into that of a sheep, and that again into the protoplasm of a man, and that again into the protoplasm of a worm; and therefore our thoughts and faculties — all that makes us man—are merely the result of the molecular forces of our protoplasm. (See Huxley on "Protoplasm," *Fortnightly Review*, p. 140. 1869.)

Most true it is that these conversions do take place daily, before our eyes; but this, which is a fact, does not render it less a fact, for which the philosopher must give account, that the original protoplasm of the man, if associated with this force—*sui generis,*—will render everything subordinate to the production of a thinking, intelligent being; and the original protoplasm of the worm, similarly associated, will render everything subordinate to the production of an unthinking creature which grovels in the earth; whilst the protoplasm of either, if unassociated with this peculiar force, will produce neither a thinking nor an unthinking animal, but will be resolved, by the molecular forces of heat, chemical affinity, and the like, into the lifeless compounds of the merely mechanical world about it.

When mechanical forces and molecular vibrations can be shown capable of producing a machine which shall go out of its way to supply itself with the materials for its own growth; which shall repair its own injuries sustained by accident or by wear and tear; and which in declining years shall produce an offspring as unlike itself as the ovum to the mature man, but which shall gradually, and with certainty, develope, *ab intra,* first one structure and then another, until it becomes a counterpart of its parent machine; then, and not till then, will the advocates of purely molecular and mechanical forces have rendered it probable, that that force called life is merely a series of mechanical molecular vibrations, and not a something so perfectly *sui generis,* that no known forces, either singly or combined, can produce the results which vitality daily presents before our eyes.*

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* The circumstances which characterise the so-called "Vital Force" as being "sui generis," and unlike any other known forces, either single or combined, are the following, amongst others.—

1. Its power of appropriating chemical substances, sometimes elementary, but often compounds of a binary nature, and converting them into highly complex compounds, which constitute either a structure, known as an organised body, or else the contents of such a body. (*Vulgo,* it assimilates, or digests.)

2. In the process of growth of a so-called living body, the original structure enlarges by interstitial appropriation of these altered chemical compounds, and not by simple additions to the exterior, as in the case of crystals or amorphous accretions. (It is nourished and grows.)

3. In the process of living growth, the general mass enlarges by changes which take place in the original organised structure, and result either in the production of multiplied repetitions of the so-called parent structure (cell or otherwise), or in the production of various structures (fibres, tubes, vessels, etc.), having no representative in the original structure; (*i. e.,* various organs are produced *de novo,* *e. g.* leaves, flowers, limbs, viscera, respiratory or circulating systems, etc.)

It has, however, I confess, always appeared to me that many extreme advocates, and also the extreme opponents, of the theory that life is merely a form of molecular motion, both advocate and oppose it, whether consciously or not, in no small degree because of the supposed moral consequences which would result from it; such as the mechanical, and therefore irresponsible, nature of our actions, and many other consequences which need not be pointed out. And it is the unacknowledged, rather than the ostensible features of the controversy, which impart their edge and bitterness to discussions upon the subject. Our province,

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4. In the further process of vital growth, new structures are produced, which in many cases differ widely from the original, and produce a resulting mass which is not a mere repetition of previously existing parts. But, although differing *toto cœlo* from any thing preceding it, this mass reproduces an organised structure, similar in character to the original from which it was itself developed, and possessing similar powers of development. (It produces an offspring,)

5. The original structure, when removed, or impaired by gradual wear and tear, or by injury, is replaced by a new structure, either similar to the original, or still characterised by those features recognised as constituting an organised structure. (Wear and tear is restored, and wounds are healed.)

6. The so-called vital force has a definite duration; so that, whilst its normal period is days in some cases, it is years in others, and ages in yet others. It is capable of being brought to a close by many forces acting upon it, so that the manifestations commonly known as "life" cease; and it is also capable of being prolonged within certain narrow limits by other forces or agencies; but no known agencies are capable of prolonging its duration indefinitely, and its manifestations come to an end from failure of the power itself, not from failure of the materials which have been previously associated with its exhibition. So that, whilst, *e.g.*, heat or electricity can be continued indefinitely by the supply of sufficient materials, the so-called vital force terminates without the failure of the materials constituting or previously maintaining the living structure. (Some things live a day, some a year, and some a century. Though you may kill them prematurely, you cannot make a daisy live as long as an oak, or a fly as long as an elephant.)

7. In a vast proportion of cases, the "vital force" is associated with, and appears to be the cause of voluntary motion, and mental and moral manifestations. They have never been produced or maintained by any known forces in the absence of this which is in this respect eminently "sui generis." The considerations connected with this subject are too extensive for the limits of a note; but, as facts and phenomena are the special field for the philosopher, it is incumbent upon the advocates of the theory that all our vital phenomena are merely the result of molecular or mechanical forces, to say why they attach the idea of moral blame to the man who kindles the martyr's pyre, whilst they regard the fire which consumes him as irresponsible, if both are alike merely the result of material forces?

however, as students of nature, and seekers after truth, is to search patiently and warily amongst the hidden things of nature; and, as they are gradually revealed, to remember that we can often at first discern but half a truth, which, whilst thus imperfectly seen, may seem to us, or to others, to be error rather than truth. But, if we persevere with an honest heart, the whole truth will at last be made known to us; and, during the search, we must always bear with us the grace of a candid spirit, which shall neither despise those who are behind us, nor distrust those who are before us or who travel on a different path from ourselves, whilst engaged in the common object of us all, the search after truth, and the desire for that reward which awaits all who ultimately attain to it.

But I must now proceed to the Sections themselves, and endeavour as far as possible to reproduce their spirit, as well as their subjects.

In the Biological Section three papers were announced to be read, in opposition to Darwinism; and it was noteworthy to observe the undisguised contempt with which the President of the Section spoke of these papers, even before they were read. Can any brains or knowledge be expected from a man who will read a paper against Darwin? That Darwinism should be thought really assailable, seemed (if one might judge from his tone and manner) to be not less absurd, in his eyes, than squaring the circle, or the attempt to discover perpetual motion, or the *elixir vitæ*. But another circumstance struck me as remarkable; and that was the great care with which, in his remarks from the chair, Professor Busk limited the range of what was to be considered Darwinism. His presidential utterances were scarcely less contemptuous than Huxley's, for those who had written against a theory of which, said he, they showed themselves profoundly ignorant, viz., "Darwinism. Development with Modification." This alone, according to the President of the Section, was the theory of Darwin; and care was taken, not by him alone, but by others, to make it appear that the extreme transmutation of species, which Darwin himself acknowledges to follow logically from his premises, was no part of his theory; and that all the features of it which have given most—shall I say offence?—had really nothing to do with it. In short, they appeared to me to draw the fangs out of his own book on the *Origin of Species*, and then to scorn the man who should say that his theory was either erroneous or an unfounded assumption.

It must be admitted that the three papers were not of a calibre which entitled them to high respect; and, although they were nominally in opposition to Darwinism, one of them had little bearing upon the subject; the second was feeble; and the third, which excited by far the most interest, was scarcely against Darwinism at all, but was in reality as vigorous an onslaught upon Huxley, and to some extent upon Hooker also, as the author, Dr. McCann, was capable of making. It was, to a great extent, a metaphysical paper, and some of the objections were weighty; but the passage in his paper which told upon the meeting with the greatest, indeed with startling effect, was the following extract from Huxley's lecture on Protoplasm, delivered in Edinburgh last November:—"I can discover no logical halting place," says Huxley, "between the admission that the dull vital actions of a fungus, or the foraminifera, are the properties of their protoplasm, and the direct results of the nature of the matter of which they are composed, and the further concession that all vital actions may with equal propriety be said to be the result of the molecular forces of the protoplasm which displays it. And, if so, it must be true that the thoughts to which I am now giving utterance are the expression of molecular changes in that matter of life (the protoplasm), which is the source of our other vital phenomena. Most undoubtedly the terms of the proposition are distinctly materialistic; and, when I undertook to deliver the present discourse, I purposed to lead you through the territory of vital phenomena, to the materialistic slough in which you find yourselves now plunged, and then to point out to you the sole path by which, in my judgment, extrication is possible." After speaking of those persons who attach importance to what is beyond the scope of our senses, of our powers of observation, or of experiment,—by which he appears to allude to those who occupy their thoughts with so-called spiritual subjects and contemplations of the future, for he compares them to people speculating upon the affairs of the inhabitants of the moon,—Huxley goes on to say, "Why trouble ourselves about matters of which, however important they may be, we do know nothing, and can know nothing? *We live in a world which is full of misery and ignorance, and the plain duty of each of us is to try and make the little corner he can influence somewhat less miserable, and somewhat less ignorant, than it was before he entered it.*"

"Most true and lamentable," said the reader of the paper, "is the misery and the wretchedness of the world, and dark is the ignorance of many of the corners of it. And what is now the sovereign remedy which is to relieve this misery, and dispel this ignorance? Let me answer in Professor Huxley's own words, which immediately follow—'To do this effectually, it is necessary to be fully possessed of only two beliefs; the first that the order of nature is ascertainable by our faculties, and the second that our volition counts for something as a condition in the course of events.' You are overwhelmed with misery—continued the reader—do you want relief? 'Believe that the order of nature is ascertainable by our faculties.' Do you want to be freed from your ignorance and wickedness? 'Believe that our volition counts for something as a condition in the course of events.'"

It would be difficult to describe the effect produced upon the audience by these extracts from Huxley's lecture; and it would require a much greater master of elocution than myself to reproduce, even feebly, the measured and bitter scorn with which Huxley replied to this attack. He could not deny the truth of the extracts. He scarcely attempted to justify or palliate them. He gave no answer to many of the objections urged against his positions by Dr. McCann, but he made a personal and *tu quoque* rejoinder, which, for bitterness, scorn, and telling power, has seldom, I believe, been heard in the British Association.*

The paper by Sir John Lubbock, on the primitive condition of man, the following day, gave rise to one of the best discussions of the meeting. It is probable that the advocates of the respective views, that man was originally debased, but has gradually risen; and, on the other hand, that he has fallen from an original high state into the present degradation in which he may now be found; would leave the discussion, strengthened in their previous views by the arguments there advanced; and if I express the opinion that far more weighty proofs of declension from a high state, than of elevation from a low one, were adduced, it is perhaps because these arguments fell in with my own belief; and thus "the wish was father to the thought." But on one point, at any rate, nearly every speaker was agreed, and that was, that moral elevation bore no relation whatever, unless it might be an inverse relation, to the position attained in intellect, cultivation, arts, or luxury, by the people under review. The speakers also were neither few nor wanting in knowledge of the subject, who bore witness to the general high moral characteristics of so-called savage or barbarous nations, in every part of the present known world. Manslaughter of an enemy, and theft, as in the shape of cattle lifting, were the principal departures from a high code of moral virtues amongst nearly every uncivilised people mentioned. And it may be well for many a civilised nation to pause before, on these two counts, it assumes to pass a verdict of guilty, as if it sat upon the judgment-seat with clean hands itself.

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* It is due to Professor Huxley to observe that the attack upon himself was made without notice in the title of Dr. McCann's paper, and that the author of that paper had failed to acquaint Huxley that he should make any personal allusion to him. Both the Professor and the audience were therefore taken by surprise at this onslaught, in a paper nominally against Darwin's theory; which may account for some of the bitterness and other features of Huxley's reply.

There was another point, also, upon which there was a general agreement: namely, that, so far as our knowledge extends, every nation that has risen to a higher state has attributed its advance to some teaching *ab extra,* not to its own unaided powers of progress. Sometimes it has claimed a God as its teacher, and at other times some prophet (by whatever name he may be designated) who has been taught by God: but it has never claimed to have made its advances without this assistance from above. The old Roman myth of the conferences of Numa with his celestial spouse, who taught him the laws and constitution which were established in the early history of that people; the Greek belief in the descent of the Gods, and the influences they imparted through the oracles and other channels; the prophetic character of Confucius and of Buddha; the Hebrew belief in the long line of prophets, which, commencing with Moses, terminated in the One far higher than Moses, in whom the Christian world believes, — these are all but illustrations of the belief which the speakers reported from all the peoples they were acquainted with, that the nations which have risen have been taught from above, and have not advanced from any inherent principle in humanity, tending naturally to rise from ignorance to knowledge, from vice to the pursuit of virtue.

The Antiquity of Man upon the Earth was incidentally alluded to during the discussion; and some remarkable circumstances have recently come to light during the exploration of Kent's Cavern, Torquay, which will not be out of place here, though they were barely touched upon in this Section, but were mentioned in the Report to the Geological Section, by Mr. Pengelly.

This cavern is of considerable extent, and stretches out in various directions, and has yielded an almost incredible number of fossils and flint instruments; the amount being above fifty thousand at the end of last year, which were contained in nearly four thousand separate boxes. We are, however, now chiefly concerned with that part of the cave which is first entered, and with one remote part which was only explored last year.

The floor of the cave is stalagmite, which averages about a foot in thickness; varying from a thin crust at the edges, to nearly two feet thick in some parts. Beneath this lies a bed of what is called cave earth, or (from its colour) "the black band," which is seldom more than a few inches thick. Beneath this again, in many parts, is a bed of very old crystalline stalagmite, many feet in thickness; and beneath this is breccia, of undetermined thickness.

About ten yards from the mouth of the cave, where the stalagmite of the floor is about a foot thick, and the roof of the cavern is comparatively lofty, a bed of the cave earth has been discovered, to which the remarks on the antiquity of man will chiefly refer. This bed is of limited extent, being about ten feet square; which would make the floor of a very moderate sized room, though a very good sized gipsy tent. Upon this earth, before the stalagmite was deposited, it is supposed that some primeval Britons had their dwelling. It is so near the cave mouth, that it is easy to read without artificial light; and a bright fire of faggots being kindled in its centre, the explorers of the cavern sat round it without inconvenience, either from the flames or the smoke. It was, therefore, adapted for human habitation; and the reason for thinking that it had been so inhabited is that, where the stalagmite has been removed, this bed of earth was found to contain many pieces of charcoal, and partially burnt bones, besides numerous bones and teeth of recent and extinct animals. Above three hundred (366) flint and other implements, and—a most remarkable proof of human habitation and human civilization—a bone needle, two and a half inches long, and pierced with an eye at one end one-eighth of an inch in diameter, capable of admitting moderately fine twine.

This needle it will be observed was found in the cave earth, beneath a bed of stalagmite nearly a foot thick; and when first discovered, it was not known to be a needle at all, nor was it supposed to be of artificial origin: for when found it was entirely encrusted with a coat of lime, so as to resemble a slender stalactite; and as such it had been placed in box No. 1847, and labelled "obtained from the cave earth below the stalagmite,"—in such and such a portion of it. Whilst lying in this box the calcareous covering had dried, and it broke off on removing it from the box on the 24th September, last year (1868), and disclosed this unexpected and remarkable specimen of human workmanship. In the same situation also *i.e.*, beneath the stalagmite, and about the same time, was discovered a bone fish spear or harpoon, which was barbed on one side only; and, like the needle, was so encrusted, as to have been placed, also as a stalactite, in another box, No. 2,206. When now we begin to speculate upon the date of these instruments, of the artificial nature of which there cannot be a shadow of doubt, we are carried back to a period so remote as to set dates at defiance. It is true that the grounds upon which to give a judgment are of doubtful value; but still they point irresistibly to something of extreme antiquity. The part of the cave in which they were found is little subject to drippings from the roof, and therefore the formation of twelve inches of stalagmite with which they were covered must have required a long period. And if it should be thought that the drippings may be very rich in dissolved lime, we are met by a practical answer from another part of the cave, which sets this supposition aside. These caves have long been known; and, with the adventurous spirit of the true Briton, Robert Hedges visited the caves in 1688; and, with the characteristic modesty of his nation, carved his name on the surface of the stalagmite about one-third of an inch deep—"Robert Hedges, February 20, 1688." Now the part of the cave in which this inscription appears is exposed to a constant dropping from the roof, and yet the inscription is barely shallower, so far as can be judged, than when first cut. There are many others also: one of the date of 1615, to which the same remark will apply. If then, in two centuries and a-half, since 1615, there has been scarcely an appreciable deposit of stalagmite in a wet dripping part of the cave, how long will have been necessary for forming a foot of stalagmite in a dry part of it? For it is found throughout the caverns, that the thickness of the stalagmite corresponds very fairly in the different parts of the cave, with its present condition as to the drop.

But if this needle and harpoon carry us back to a date far beyond what we can master, a still more recent discovery extends the date to a still more remote period, which is, indeed, almost beyond conjecture. Whilst excavating on the 5th of March, of the present year, 1869, a flint flake was found in the rock beneath the lower bed of stalagmite, which was in that place many feet in thickness. And of its artificial formation, those who are best qualified to judge entertain no doubt.

Mr. John Evans, F.R.S., says of it, "It is undoubtedly of human workmanship, ... and it has taken five or six blows, each administered with a purpose in view, to produce this instrument. . . . . And not only has it been artificially made, but it carries upon it evidences of having been in use as a tool, for the edge is worn away along its entire length, and exhibits the slightly jagged appearance, such as I find by experience to result from scraping bone, or other hard substances, with the edge of a flint flake."—(*Pengelly's Report*, pp. 15, 16.)

To yourselves I must leave the inferences to be drawn from these remarkable discoveries; and conclude this address, which I fear has already overtaxed your patience, with a slight allusion, involving no derangement of old beliefs, to an interesting paper by Professor Jacobi, in the Chemical Section. It has been long known that copper, silver, and some other metals, could be deposited upon other metals by means of the galvanic current; but hitherto chemists have not been able to separate iron from its salts, and deposit it by the process of electrotyping. Professor Jacobi, however, has discovered that by mixing magnesian sulphate with ferric sulphate, he can plate with iron as well as hitherto with other metals; and he exhibited several specimens of iron plating of great beauty. A circumstance of great interest was mentioned by him in connection with this newly-deposited iron, viz., that like palladium, it is capable of condensing hydrogen, and forming a solid alloy. It absorbs about twenty times its volume of this gas, which so far alters its own dimensions, that if one surface only of an iron plate be exposed to the gas, it expands, becoming convex, and rendering the previously flat plate partially curled up.

Whilst mentioning this circumstance, it will not be out of place to associate it with the name of Professor Graham, who has been removed from amongst us almost before this addition to his own discoveries in hydrogen absorption could have reached his ears. Of him, I will only say, that truthfulness and perseverance were the characteristics of his life; and "constancy to the end" will be the memorial he will have left behind him, that we may learn to follow in his steps.

FIRST ORDINARY MEETING.

Royal Institution, 18th October, 1869.

JOHN BIRKBECK NEVINS, M.D., President, in the Chair.

Ladies had been invited to the Meeting, and the attendance of Members and their friends was unusually large.

Messrs. J. Campbell Brown, B.Sc., F.R.C.S., Henry James Cook, and William Bolton Jones were unanimously elected Ordinary Members. Professors Dr. Riehm and Dr. Schlottman, of the University of Hallé, were elected Honorary Members.

Mr. Baruchson exhibited an interesting series of maps, illustrative of the progress and present condition of education in France.

Messrs. Picton, Higgins, and Marples made some remarks upon the observations they had made upon the webs of the gossamer spider, during the late extraordinary appearances of these insects in the neighbourhood of Liverpool.

The Paper for the evening was read by Mr. William Morrison, M.P., "On the Origin of the Palestine Exploration Fund," and was illustrated by an extensive series of maps, diagrams, and antiquities, together with models of Ancient Jerusalem and the Church of the Holy Sepulchre.

Previous to the Ordinary Business of the evening, an Extraordinary Meeting of the Society was held, to confirm the vote of £50 (to the local fund of the British Association) proposed and carried at the Annual Meeting. The vote was unanimously agreed to.

SECOND ORDINARY MEETING.

ROYAL INSTITUTION, 1st November, 1869.

ALFRED HIGGINSON, M.R.C.S., VICE-PRESIDENT, in the Chair.

Messrs. W. Kinsman and C. H. Cook were unanimously elected ordinary Members.

The President read a paper "On some Recent Discoveries in Astronomy and Optics," which was illustrated with numerous diagrams.

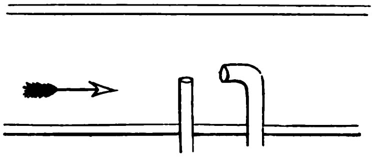
THIRD ORDINARY MEETING.

ROYAL INSTITUTION, 15th November, 1869.

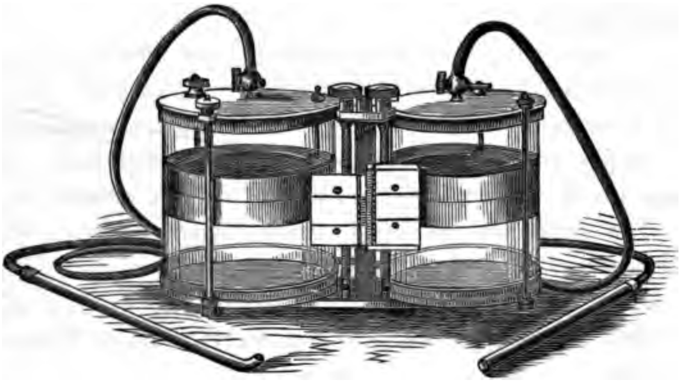
JOHN BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Messrs. Joseph King, W. K. Kent, B. De Beer, A. Morgan, and E. H. L. Hartwig were unanimously elected Ordinary Members.

Mr. T. J. Moore exhibited the following objects:—A fine skull of the Babirusa, and the skull of a rare species of Crocodile (*Mecistops cataphractus*), probably from West Africa, and remarkable for the long and slender form of the jaws; (these objects were recently bequeathed tions are made by means of a moving column of ether. The instrument consists, firstly, of two brass tubes of about $\frac{3}{10}$ths inch internal diameter, open throughout, and of any length; secondly, of a manometer. The end of one tube is straight and plain; the end of the other is bent to a right angle. When in use, these tubes are placed parallel to each other, and so that their ends are exposed to the current of air to be measured. They lie at right angles to the current, which thus crosses the open end of the one, and blows into the bent end of the other.



By this means, a partial vacuum is established in the straight tube; and a differential manometer, attached to the outer ends of the tubes, will show the excess of pressure in the bent one, over that in the straight one. The manometer used is essentially a U tube, whose vertical limbs are cylinders, of one or more inches diameter. The fluid used is



ether, and the level is read off by the use of an ivory scale and vernier. These, by means of adjusting screws, are brought to coincide with lines on the floats, which rise and fall with the columns of ether in the instrument.

The difference of level of the columns may be read off to $\frac{1}{1000}$ inch. This difference of level may be taken as a measure of the speed of the air passing the ends of the tubes, if we can find out the law which governs it.

Before establishing the law by mathematical deduction, I attempted by experiment to find the connection between the speed of the air and the reading of the manometer, and empirically to construct a table of them. This I described on a former occasion; but, as since then these experiments have been repeated with some modification, it may be well to give a brief account of them now.

The object in view was, first, to obtain a current of air of known velocity, then to expose my anemometer to its influence, and read off the speed indicated.

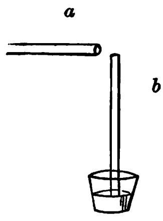
Many difficulties were met with in trying to get this regulated current of air; these I need not now detail. The following method was adopted.

A straight flue, or air channel, in connection with a high chimney, was obtained; the length of those used in the different experiments varied from 50 to 100 feet, and in sectional area, from 2 to 6 square feet. At the end of the flue, next the chimney, a slide, or damper, regulated the flow of air. Near it were fixed two panes of glass, in the walls of the flue, opposite to one another, so that an observer could see through the column of moving air. The end furthest from the chimney was open. There, from time to time, at a given signal, a few grains of gunpowder were ignited, and soon the smoke, travelling with the air in the flue, was seen to pass the panes of glass. The time occupied by the smoke in travelling the length of the flue could thus be accurately noted, and the rate calculated. It will afterwards be seen that the result of these experiments comes very close to that obtained by purely mathematical reasoning.

The mathematical problem to be solved may be briefly stated thus:--

The lower end of a vertical tube, open at both ends, dips into a liquid. To what height will the liquid be raised in the tube by the action of a current of air passing with a given velocity across its upper end?

It will be seen that such an action takes place when I blow through tube *a*, which directs a current of air across the open end of *b*. The lower end of *b* dips into water. It is difficult to explain the exact nature of the action which takes place. Perhaps the particles of air moving horizontally drag forward the particles at the end of the vertical column. These are replaced by others, to be dragged away in their turn, and thus a partial vacuum is set up in the vertical tube. Be this supposition correct or not, we may, however, be sure that some air flows out of the vertical tube, and is carried away by the horizontal current. If the force of the horizontal current is thus expended in propelling this air, the action may be considered as one of impact. Now the force of impact of a moving column of air can be calculated.



Let v = velocity of the air in feet per second.

g = gravity = 32·18 feet per second.

w = weight of a cubic foot of air at 60° F. and 29·92 inches barometric pressure = 0·076107 lbs.

P = pressure in lbs. per square foot of a flat surface held at right angles to the direction of the current of air.

Then $v^2w = gP$.

Let p = the height of the column of liquid driven up the tube, measured in inches.

W = weight in lbs. of $\frac{1}{12}$ cubic foot of this liquid.

Then $P = pW$; $v^2w = gpW$; $v = \sqrt{p\frac{gW}{w}}$. Where the liquid used is water, $W = 5{\cdot}20833$, and $v = \sqrt{p}\ 46{\cdot}92$, or $p = \frac{v^2}{2202}$. That is, if I have raised water in the vertical tube 12 inches, by forcing a jet of air across the top of it, that jet of air was moving at the rate of 162·6 feet per second.

In the anemometer before you, ether of the specific gravity 0·740 is employed, and the instrument is so used that the reading is double the actual column of ether supported.

In this case $v = \sqrt{\frac{p}{2}\frac{gW}{w}} = \sqrt{p}\ .\ 28{\cdot}55.$

In order now to see what correction will be necessary when the temperature of the stream of air is different from that of 60° Fahr.,

Let v^1 = velocity of air at some other temperature, say at the temperature of t degrees Fahr.

w^1 = weight of a cubic foot of air at that temperature.

vol^1 = volume of a cubic foot of air at that temperature.

$$\text{Then } \frac{v}{v^1} = \frac{vol.^1}{vol.} = \frac{vol.\text{ at } 32^\circ\left(1 + \frac{t-32}{491}\right)}{vol.\text{ at } 32^\circ\left(1 + \frac{60-32}{491}\right)} = \frac{459+t}{519}.$$

$$\text{Or } \frac{1}{w^1} = \frac{1}{w}\ \frac{459+t}{519}.$$

$$\text{But } v = \sqrt{\frac{p}{2}\ \frac{gW}{w}} \text{ or } v^1 = \sqrt{\frac{p}{2}\ \frac{gW}{w^1}} = \sqrt{\frac{gpW}{2}\ \frac{1}{w}\ \frac{459+t}{519}}$$

$$= \sqrt{p\frac{459+t}{519}} \times 28{\cdot}55.$$

But it is generally necessary to carry the correction a step further, and to give the velocity in feet of air at 60° temperature.

$$\text{Now } v = v^1 \frac{vol.}{vol.^1} = v^1 \frac{519}{459+t}$$

$$= \sqrt{p\frac{459+t}{519}} \times 28{\cdot}55 \times \frac{519}{459+t}$$

$$= \sqrt{p\frac{519}{459+t}} \times 28{\cdot}55.$$

Further, to correct for variations in barometric pressure,

Let v'' = velocity of air at some other pressure than 29·92 inches, say at a pressure of h inches.

w'' = weight of a cubic foot of air at that pressure.

$vol.''$ = volume of the same.

$$\text{Then } \frac{w}{w''} = \frac{29{\cdot}92}{h}; \text{ or } \frac{1}{w''} = \frac{1}{w}\,\frac{29{\cdot}92}{h}.$$

$$\text{As above, } v'' = \sqrt{\frac{p}{2}\,\frac{gW}{w''}} = \sqrt{\frac{h}{2}\,\frac{gW}{w}\,\frac{29{\cdot}92}{h}}$$

$$= \sqrt{p\frac{29{\cdot}92}{h}}.\ 28{\cdot}55.$$

In cases where it is necessary to give the velocity in feet of air at a pressure 29·92 inches:

$$\frac{v}{v''} = \frac{h}{29{\cdot}92} \qquad v = v''\,\frac{h}{29{\cdot}92} = \sqrt{p\frac{h}{29{\cdot}92}} \times 28{\cdot}55.$$

The complete formula, embodying the formula of correction for variations of temperature, and also of barometric pressure, would therefore be—

$$v = \sqrt{p\frac{h}{29{\cdot}92}\cdot\frac{519}{459+t}} \times 28{\cdot}55.$$

v being the velocity of air at a temperature of t degrees Fahr., under a pressure of h inches of mercury; but the velocity is measured in feet per second of air at the normal temperature and pressure. When drawing a sample of air from a chimney, in order to examine it, that sample is measured by the aspirator employed, under the existing barometric pressure; we want, therefore, the velocity to be given in feet of air, under the same condition. The following is the formula then to be used:

$$v = \sqrt{p\frac{29{\cdot}92}{h} \cdot \frac{519}{459 + t}} + 28{\cdot}55.$$

In these expressions, the number 28·55 is the constant multiplier deduced. It remains to be seen what number will be deduced from the experiments before described.

Expressing v in terms of the other factors, we have

$$c = \sqrt{\frac{v^2}{p} \cdot \frac{29{\cdot}92}{h} \cdot \frac{459 + t}{519}}.$$

Below is a schedule of the experiments, the values of c being calculated from each, and an average taken.

No. of Experiment.	Distance. Feet.	Time occupied by Smoke. Seconds.	Speed of Smoke. Feet per Second.	Pressure shown by Anemometer. Inches.	Temperature of Air in the Flue. Deg. Fahr.	Barometer pressure. Inches.	Value of c.
1	55	9	6·111	0·045	54	30·10	28·56
2	117	12·3	9·513	0·1055	50	30·10	28·92
3	94	13·5	6·963	0·0575	55	29·65	29·02
4	94	16·5	5·757	0·038	55	29·65	29·21
5	145	8	18·12	0·4195	44	30·30	27·38
6	145	16	9·06	0·101	44	30·30	27·90
						Average	28·50

These experiments were made in three separate flues, and many experiments were made in each. The above are the average of the results.

The average value of c in the experiments is 28·50, while the value arrived at by purely mathematical considerations is 28·55. This close correspondence is the more satisfactory when the difficulty of accurately measuring short intervals of time is borne in mind.

I have, therefore, adopted the formula $v = \sqrt{p} \times 28{\cdot}55$, as correct, and calculated from it a table, showing the velocities which correspond to the various readings of the anemometer. The table is annexed; also a table showing the correction to be made for variations in the temperature of the air whose speed is to be measured. The corrections to be made for small variations of barometric pressure are unimportant. When it is necessary to make the correction, recourse must be had to the formula.

$$v'' = \sqrt{p\frac{29{\cdot}92}{h}} \times 28{\cdot}55, \text{ or } v = \sqrt{p\frac{h}{29{\cdot}92}} \times 28.55,$$

according to the circumstances of the case. In the former, the velocity is given in feet per second of air measured under the barometric pressure existing in the air channel; in the latter, it is given in feet per second of air measured under a pressure of 29·92 inches of mercury.

It may be asked if allowance should be made for the expansion or contraction which will take place in the ether of the manometer when exposed to varying temperatures. The variations of temperature to which the manometer itself is exposed are not great, being those of the external atmosphere only. It may be said that for a variation of 10 degrees the error introduced will be about one per cent. Thus, if the manometer has been exposed to a temperature of 50°, and the speed of the air experimented on has been calculated at 10 feet per second, the real speed will be 10·1 feet. If the temperature of the ether in the manometer was 70°, then the real speed, in place of 10 feet, will be 9·9 feet per second.

In order to test by experiment the correctness of the formula for making allowance for variations in the temperature of the air whose velocity is to be measured, the following trial was made. In a furnace constructed for an experimental purpose, a current of air entered through a pipe 9 inches diameter at a temperature of 170°; after traversing channels of red-hot brick work, it passed out through a 6-inch pipe at a temperature of 560°.

The reading of the anemometer at the inlet flue was 0·012 inch. Referring to the table, the speed given is 3·127 feet per second. The correcting figure for the temperature 170° is 0·9083. Multiplying the two together, we have 2·84 feet per second as the speed of the air measured at 60°. The quantity of air passing was, therefore, 1·255 cubic feet per second.

At the outlet pipe, the anemometer reading was 0·102 inch, showing by the table a speed of 9·118 feet per second, to be multiplied by 0·7137, the figure of correction for the temperature 560°. This gives 6·508 feet per second for the speed of air measured at 60° ; therefore the quantity of air passing was 1·278 cubic feet per second. The error is less than two per cent. Such an approximation is perhaps as close as could be expected in measurements of this kind, and may, it is thought, be taken as a confirmation of the general correctness of the formulæ.

TABLE I.

Table to show the Speed of Currents of Air as indicated by the Ether Anemometer.

$$v = \sqrt{p} \times 28{\cdot}55.$$

Temperature 60° Fahr. Barometer 29·92 inches.

Manometer Reading: Inches.	Speed of Air: Feet per Second.	Manometer Reading: Inches.	Speed of Air: Feet per Second.	Manometer Reading: Inches.	Speed of Air: Feet per Second.
0·001	0·903	0·039	5·638	0·077	7·922
0·002	1·277	0·040	5·710	0·078	7·974
0·003	1·564	0·041	5·781	0·079	8·025
0·004	1·806	0·042	5·851	0·080	8·075
0·005	2·019	0·043	5·921	0·081	8·125
0·006	2·212	0·044	5·989	0·082	8·175
0·007	2·389	0·045	6·056	0·083	8·225
0·008	2·554	0·046	6·123	0·084	8·275
0·009	2·709	0·047	6·189	0·085	8·324
0·010	2·855	0·048	6·255	0·086	8·373
0·011	2·994	0·049	6·320	0·087	8·421
0·012	3·127	0·050	6·384	0·088	8·469
0·013	3·255	0·051	6·448	0·089	8·517
0·014	3·378	0·052	6·510	0·090	8·565
0·015	3·497	0·053	6·572	0·091	8·613
0·016	3·612	0·054	6·634	0·092	8·660
0·017	3·723	0·055	6·695	0·093	8·707
0·018	3·830	0·056	6·756	0·094	8·754
0·019	3·935	0·057	6·816	0·095	8·800
0·020	4·038	0·058	6·876	0·096	8·846
0·021	4·137	0·059	6·935	0·097	8·892
0·022	4·235	0·060	6·993	0·098	8·938
0·023	4·330	0·061	7·051	0·099	8·983
0·024	4·423	0·062	7·109	0·100	9·028
0·025	4·514	0·063	7·166	0·102	9·118
0·026	4·604	0·064	7·223	0·104	9·207
0·027	4·691	0·065	7·279	0·106	9·295
0·028	4·777	0·066	7·335	0·108	9·383
0·029	4·862	0·067	7·390	0·110	9·469
0·030	4·945	0·068	7·445	0·112	9·554
0·031	5·027	0·069	7·500	0·114	9·639
0·032	5·107	0·070	7·554	0·116	9·724
0·033	5·187	0·071	7·608	0·118	9·808
0·034	5·265	0·072	7·661	0·120	9·891
0·035	5·342	0·073	7·713	0·122	9·972
0·036	5·418	0·074	7·766	0·124	10·05
0·037	5·492	0·075	7·819	0·126	10·13
0·038	5·565	0·076	7·871	0·128	10·21

TABLE 1.—*continued.*

Manometer Reading : Inches.	Speed of Air : Feet per Second.	Manometer Reading : Inches.	Speed of Air : Feet per Second.	Manometer Reading : Inches.	Speed of Air : Feet per Second.
0·130	10·29	0·222	13·45	0·314	16·00
0·132	10·37	0·224	13·51	0·316	16·05
0·134	10·45	0·226	13·57	0·318	16·10
0·136	10·53	0·228	13·63	0·320	16·15
0·138	10·60	0·230	13·70	0·322	16·20
0·140	10·68	0·232	13·76	0·324	16·25
0·142	10·76	0·234	13·82	0·326	16·30
0·144	10·83	0·236	13·88	0·328	16·35
0·146	10·91	0·238	13·94	0·330	16·40
0·148	10·98	0·240	13·99	0·332	16·45
0·150	11·06	0·242	14·05	0·334	16·50
0·152	11·13	0·244	14·11	0·336	16·55
0·154	11·20	0·246	14·17	0·338	16·60
0·156	11·27	0·248	14·23	0·340	16·65
0·158	11·34	0·250	14·28	0·342	16·70
0·160	11·42	0·252	14·34	0·344	16·75
0·162	11·49	0·254	14·40	0·346	16·80
0·164	11·56	0·256	14·45	0·348	16·85
0·166	11·63	0·258	14·50	0·350	16·89
0·168	11·70	0·260	14·56	0·352	16·94
0·170	11·77	0·262	14·62	0·354	16·99
0·172	11·84	0·264	14·68	0·356	17·04
0·174	11·91	0·266	14·74	0·358	17·09
0·176	11·98	0·268	14·79	0·360	17·13
0·178	12·05	0·270	14·84	0·362	17·18
0·180	12·11	0·272	14·90	0·364	17·23
0·182	12·18	0·274	14·96	0·366	17·28
0·184	12·25	0·276	15·01	0·368	17·33
0·186	12·31	0·278	15·06	0·370	17·37
0·188	12·38	0·280	15·11	0·372	17·42
0·190	12·45	6·282	15·17	0·374	17·47
0·192	12·51	0·284	15·23	0·376	17·52
0·194	12·57	0·286	15·28	0·378	17·56
0·196	12·64	0·288	15·33	0·380	17·60
0·198	12·71	0·290	15·38	0·382	17·65
0·200	12·77	0·292	15·44	0·384	17·70
0·202	12·83	0·294	15·49	0·386	17·75
0·204	12·90	0·296	15·54	0·388	17·79
0·206	12·96	0·298	15·59	0·390	17·83
0·208	13·02	0·300	15·64	0·392	17·88
0·210	13·08	0·302	15·70	0·394	17·93
0·212	13·15	0·304	15·75	0·396	17·98
0·214	13·21	0·306	15·80	0·398	18·02
0·216	13·27	0·308	15·85	0·400	18·06
0·218	13·33	0·310	15·90	0·402	18·11
0·220	13·39	0·312	15·95	0·404	18·16

TABLE I.—*continued.*

Manometer Reading: Inches.	Speed of Air: Feet per Second.	Manometer Reading: Inches.	Speed of Air: Feet per Second.	Manometer Reading: Inches.	Speed of Air: Feet per Second.
0·406	18·20	0·458	19·32	0·550	21·17
0·408	18·24	0·460	19·36	0·560	21·37
0·410	18·28	0·462	19·41	0·570	21·56
0·412	18·33	0·464	19·45	0·580	21·75
0·414	18·38	0·466	19·49	0·590	21·94
0·416	18·42	0·468	19·53	0·600	22·12
0·418	18·46	0·470	19·57	0·610	22·30
0·420	18·50	0·472	19·62	0·620	22·48
0·422	18·55	0·474	19·66	0·630	22·66
0·424	18·60	0·476	19·70	0·640	22·84
0·426	18·64	0·478	19·74	0·650	22·02
0·428	18·68	0·480	19·78	0·660	23·20
0·430	18·72	0·482	19·82	0·670	23·38
0·432	18·77	0·484	19·86	0·680	23·55
0·434	18·82	0·486	19·90	0·690	23·72
0·436	18·86	0·488	19·94	0·700	23·89
0·438	18·90	0·490	19·98	0·750	24·73
0·440	18·94	0·492	20·02	0·800	25·54
0·442	18·99	0·494	20·06	0·850	26·32
0·444	19·03	0·496	20·10	0·900	27·08
0·446	19·07	0·498	20.14	0·950	27·83
0·448	19·11	0·500	20·18	1·000	28·55
0·450	19·15	0·510	20·38	1·250	31·93
0·452	19·20	0·520	20·58	1·500	34·97
0·454	19·24	0·530	20·78	1·750	37·77
0·456	19·28	0·540	20·98	2·000	40·37

TABLE II.

TABLE of the VALUES of $\sqrt{\dfrac{519}{459+t}}$ for VALUES of t from 0 to 1,000; or CORRECTIONS for TEMPERATURE.

t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$	t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$	t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$
0	1·0634	20	1·0409	40	1·0198
5	1·0577	25	1·0355	45	1·0148
10	1·0520	30	1·0302	50	1·0098
15	1·0464	35	1·0250	55	1·0049

TABLE II.—*continued.*

t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$	t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$	t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$
60	1·0000	290	0·8324	520	0·7280
65	0·9952	295	0·8296	525	0·7261
70	0·9905	300	0·8269	530	0·7243
75	0·9858	305	0·8242	535	0·7225
80	0·9812	310	0·8215	540	0·7207
85	0·9767	315	0·8189	545	0·7189
90	0·9723	320	0·8163	550	0·7171
95	0·9679	325	0·8137	555	0·7153
100	0·9636	330	0·8111	560	0·7137
105	0·9593	335	0·8085	565	0·7119
110	0·9551	340	0·8060	570	0·7102
115	0·9509	345	0 8035	575	0·7085
120	0·9468	350	0·8010	580	0·7068
125	0 9428	355	0·7985	585	0·7051
130	0·9388	360	0·7960	590	0·7034
135	0·9348	365	0·7936	595	0·7017
140	0·9309	370	0·7912	600	0·7000
145	0·9270	375	0·7888	605	0·6983
150	0·9232	380	0·7865	610	0·6967
155	0 9194	385	0·7842	615	0·6951
160	0·9156	390	0·7819	620	0·6935
165	0·9119	395	0·7786	625	0·6919
170	0·9083	400	0·7763	630	0·6903
175	0·9047	405	0·7741	635	0·6887
180	0·9012	410	0·7729	640	0·6871
185	0·8977	415	0·7707	645	0·6856
190	0·8943	420	0·7685	650	0·6841
195	0·8909	425	0·7663	655	0·6826
200	0·8875	430	0·7641	660	0·6811
205	0·8841	435	0·7619	665	0·6796
210	0 8808	440	0·7598	670	0·6781
215	0·8775	445	0·7577	675	0·6766
220	0 8743	450	0·7556	680	0 6751
225	0·8711	455	0·7535	685	0 6736
230	0·8680	460	0·7514	690	0·6721
235	0·8649	465	0·7494	695	0·6706
240	0·8618	470	0·7474	700	0·6691
245	0·8587	475	0·7454	705	0·6676
250	0·8557	480	0·7434	710	0·6662
255	0 8527	485	0·7414	715	0·6648
260	0·8497	490	0·7394	720	0·6634
265	0·8467	495	0·7375	725	0·6620
270	0·8438	500	0·7356	730	0·6606
275	0·8409	505	0 7337	735	0·6592
280	0·8380	510	0·7318	740	0·6578
285	0·8352	515	0·7299	745	0·6565

TABLE II.—*continued.*

t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$	t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$	t Degrees Fahrenheit.	$\sqrt{\frac{519}{459+t}}$
750	0·6552	835	0·6333	920	0·6136
755	0·6538	840	0·6321	925	0·6125
760	0·6524	845	0·6309	930	0·6114
765	0·6511	850	0·6297	935	0·6103
770	0·6498	855	0·6285	940	0·6092
775	0·6485	860	0·6273	945	0·6081
780	0·6472	865	0·6261	950	0·6070
785	0·6459	870	0·6249	955	0·6059
790	0·6446	875	0·6237	960	0·6048
795	0·6433	880	0·6225	965	0·6037
800	0·6420	885	0·6214	970	0·6026
805	0·6407	890	0·6203	975	0·6015
810	0·6395	895	0·6192	980	0·6004
815	0·6382	900	0·6181	985	0·5994
820	0·6369	905	0·6169	990	0·5984
825	0·6357	910	0·6158	995	0·5974
830	0·6345	915	0·6147	1000	0·5964

FOURTH ORDINARY MEETING.

Royal Institution, 29th November, 1869.

JOHN BIRKBECK NEVINS, M.D., President, in the Chair.

Messrs. H. H. Statham, Junr., and Isaac Roberts were unanimously elected Ordinary Members.

The paper "On National Education," by Mr. Flueck, which had been appointed for the Meeting, was not read, owing to that gentleman's indisposition.

It was therefore moved by the Rev. Dr. Ginsburg, and seconded by the Hon. Secretary, "That the subject of National Education should form the topic of discussion for the evening," which was carried.

The President then read an abstract, explanatory of the scheme put forth by the Manchester Educational Union. This gave rise to a lengthened discussion, which occupied the remainder of the evening.

FIFTH ORDINARY MEETING.

Royal Institution, 13th December, 1869.

JOHN BIRKBECK NEVINS, M.D., President, in the Chair.

Ladies were invited to attend this Meeting.

Messrs. Alexander N. Tate, F.C.S., R. W. Roulston, and Harold Waterhouse were unanimously elected Ordinary Members.

Mr. Mott exhibited some large sketch maps of the route of the Suez Canal, and gave some interesting particulars in explanation. He also read Dr. Livingstone's letter, published that day in *The Times* newspaper, and pointed out the places mentioned on a large sectional map of Africa (territory of the Cazembe), exhibited at the previous meeting.

Mr. E. Davies, F.C.S., exhibited some artificial alizarine, in powder and paste, prepared from anthracen.

Mr. Flueck then read his paper "On National Education," which had been postponed from the previous meeting.

SIXTH ORDINARY MEETING,

ROYAL INSTITUTION, 10th January, 1870.

JOHN BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Mr. T. J. Moore introduced Captain Berry (ship *Richard Cobden*), Associate of the Society, and brought before the meeting a drawing, and the skull, of a small Bottle-nose Whale, which appeared to be the species described by Dr. Gray, under the name of *Lagenorhynchus Electra*, and of which only the skull had hitherto been known. The drawing was made, and dimensions had been taken, from the skin of the creature. This had been brought home in pickle, but, unfortunately, from various circumstances, could not be preserved. Specimens of *Anabas*, *Ophiocephalus*, and other fish, forming part of a collection made by Captain Berry, at the Irawady, were also shown, as well as the skull and horns of a Muntjac deer, and skull and horns of Eld's Deer (*Cervus* [*panolia*] *Eldi*), from Rangoon; and a large singular membranous mass of fish spawn. This mass (which was of a reddish brown colour, of oval shape, eight inches long, and five inches in diameter), was taken by Captain Berry from the stomach of a shark, captured in lat. 7 deg. N., long. 65 E., and consisted of ova of the size of those of the herring, and loosely held together by their membranous folds. Embedded in the very centre of the mass, was a hard substance, which could be felt, but in nowise seen. On Mr. Moore cutting into the mass, this substance was found to be a young Turtle (*Chelonia imbricata?*), six inches long! The explanation of this seeming mystery would probably be, that the young turtle had swum into a quantity of fish spawn, and, becoming entangled therein, had become more and more completely enveloped the more he struggled to free himself, and that turtle and spawn had been swallowed together.

Mr. Moore also exhibited a very large specimen of Cuttle fish (*Octopus*), the head and body of which measured a foot in length, and the longer tentacles twenty inches, making a total length of two feet eight inches. This magnificent specimen had been collected off Agulhas Bank, by Captain John Walker (ship *St. Magnus*), Associate of the Society, and presented to the Museum, with a bottle containing fish spawn, found in lat. 35.55 S., long. 7.40 E., attached to a piece of drift wood, and similar in character to that brought by Capt. Berry. Captain Walker had also collected several bottles of small marine specimens, but these were reserved for a future meeting. All the specimens above-mentioned had been presented to the Museum by the gentlemen named.

The following paper was then read:

ON THE ARTIFICIAL FORMATION OF ORGANIC COMPOUNDS.

By J. CAMPBELL BROWN, D.Sc. Lond., F.C.S.

In the early days of accurate chemical research, *i.e.*, in the beginning of this century, it was believed that plants and animals were able to elaborate chemical compounds of great complexity of structure, by means of their vital force, altogether independently of ordinary chemical laws, and often in defiance of these laws. It was supposed that the art of the chemist could only enable him to examine these substances, and enrich science by a description of their properties. Sometimes he might turn them to practical use, in medicine or the arts; and he could always pull them to pieces; but he could never build them up again.

The history of these compounds was considered a distinct branch of science—"Organic Chemistry."

In the department of Mineral Chemistry, however, the chemist could go further. When he had studied an inorganic compound, and pulled it to pieces—analysed it—he could put the parts together again at will; and he could even create new mineral species. By the study of syntheses and decompositions, laws were discovered which regulate the combinations of the elements, so long as they are beyond the influence of any organised body, but which were supposed to be held in abeyance, and superseded, by the so-called "vital force."

Further labours proved that heat, the great instrument of destruction, or rather of decomposition (for nothing is ever destroyed), is able also to build up complicated chemical structures, just as well as the living cells and tissues of

DIAGRAMS.

Fig. 1.

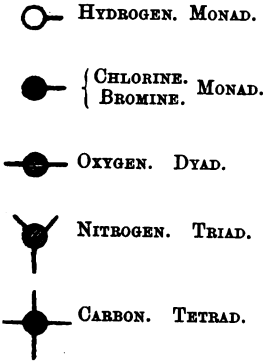


Fig. 2.

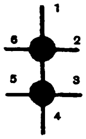


Fig. 3.
Marsh Gas.
$C\ H_4$

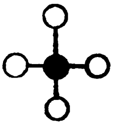


Fig. 4.
Difference.
$C\ H_2$

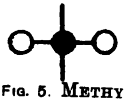


Fig. 5. Methyl.
$C_2\ H_6$

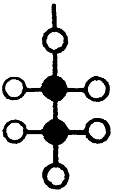


Fig. 6.
Acetylene.
$C_2\ H_2$

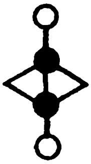


Fig. 7.
Ethylene.
$C_2\ H_4$

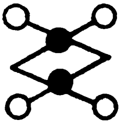


Fig. 8.
Tritylene.
$C_3\ H_6$

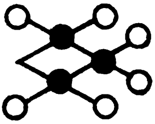


Fig. 9.
Tetrylene.
$C_4\ H_8$

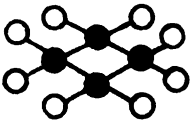


Fig. 10.
Benzol.
$C_6\ H_6$

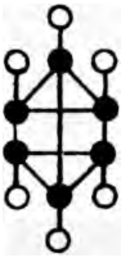


Fig. 11.
Aniline.
$C_6\ H_7\ N.$

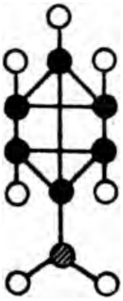


Fig. 12.
Naphthalin.
$C_{10}\ H_8$

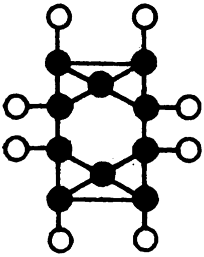


Fig. 13.
Anthracene.
$C_{14}\ H_{10}$

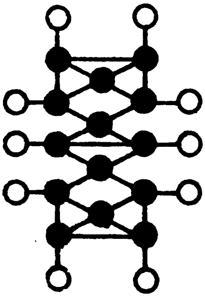


Fig. 14.
Anthraquinone.
$C_{14}\ H_8\ O_2$

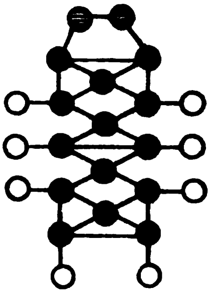


Fig. 15.
Bibrom-Anthraquinone.
$C_{14}\ H_6\ Br_2\ O_2$

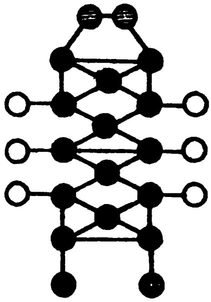
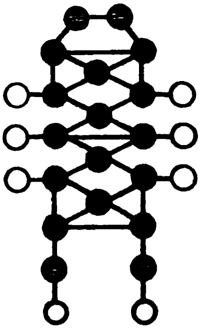


Fig. 16
Alizarin.
$C_{14}\ H_8\ O_4$



plants and animals; and, further, that ordinary chemical laws are of universal application; and that living organisms, instead of defying these laws, actually follow them, in performing their functions, and in constructing the so-called organic compounds.

Once started on the work of construction, experimenters soon formed new compounds which had never been formed by living organisms, but which were similarly constituted, and possessed similar properties, to those which are produced by plants and animals.

Organic chemistry is no longer a distinct science, with laws of its own, but only an artificial and convenient division of the science of chemistry, embracing an innumerable series of compounds, which have but one feature in common; namely, they all contain *carbon.*

The reason why the compounds of carbon are so numerous depends on a property of the atoms, which has been called atomicity, or quantivalence. The atoms of each element have the power of uniting with only a certain number of other atoms. Whether this property arises from centres of attraction in the atoms, or some other cause, we do not know.

1. Many atoms can only unite with one other atom. Hydrogen is the type of this class; its atoms have but one unit of affinity. We may call them one-handed atoms—*Monads.*

2. Others, of which Oxygen is the type, have two units of affinity. Each atom of this class may unite with two monad atoms; or it may be satisfied with the two affinity units of a single atom like itself. We may call them two-handed atoms—*Dyads.* (See Diagrams, Fig. 1.)

3. Nitrogen, and some other elements, are three-handed atoms, or *Triads.*

4. Carbon is the principal *Tetrad* element. Its atoms

have four units of affinity, which may enable it to unite with (1) one triad and one monad, or (2) with two dyads, or (3) with one dyad and two monads, or (4) with four monads. Further, one atom may be united to a second atom of carbon by one affinity-unit of each, when the condensed atom is capable of uniting with so many as six monads (see Fig. 2); and this process of condensation may be continued until a dense carbon atom is found capable of uniting with any finite even number of atoms.

In the diagram, I have represented these affinity-units by lines, or bonds; and I hope it is understood that these have no real existence in nature, but merely represent the attractive forces which keep the atoms together in one molecule, just as the brass rods of an orrery represent the attractive forces which keep the sun and planets together in one system. In all cases, the molecule is the smallest quantity which can exist in the free state, and, when in the state of vapour, has always the volume of two united atoms of hydrogen, H-H.

The first definite organic compound that was produced artificially was Urea. This was formed by Wohler, in 1828, by the action of heat on cyanate of ammonium.

If we mix a solution of a salt of cyanic acid with a solution of a salt of ammonium, both of which can be formed from the free elements of which they are composed, we get a solution of cyanate of ammonium. I prepare some of this salt in a test-tube. It is difficult to show you the nature of the change which takes place in its constitution when boiled; but, at any rate, I shall show you that a change does take place. While one half of the solution is being boiled in the dish, I add to the other half a few drops of a strong acid. The weaker acid, cyanic acid, is expelled; and you observe the effervescence which is produced by the addition of an acid. The salt is constituted thus:— $\left.\begin{matrix}NH_4\\CN\end{matrix}\right\}O$; but, after being boiled down, during which operation nothing but water escapes, the elements have rearranged themselves thus—$\left.\begin{matrix}CO\\H_4\end{matrix}\right\}N$. There is no cyanic acid present. The solution contains, not a salt, but a basic body, whose binding atom is nitrogen, not oxygen as before; and now, on the addition of a strong acid, you observe no effervescence. There is no weak acid to be expelled; but the strong acid unites with the newly formed base to form a salt of urea, quite undistinguishable from that which we get from urine.

Before attempting to build up any substance, it is necessary, first, to ascertain of what elements it is composed, and in what proportions these are present; and second, how the constituent elements are grouped. It is impossible to ascertain the position of the atoms, as we can of the rooms in a house; but we can ascertain, by studying the decompositions of a substance, what are the relations of the constituent atoms to each other.

The first step in organic syntheses is to get carbon to unite with hydrogen. This is done by passing electric currents of high tension between carbon poles, in an atmosphere of hydrogen. At the high temperature of the electric spark, two atoms of each of the two elements combine to form a molecule of a gas called Acetylene, C_2H_2. (See Fig. 6.) It combines with copper, and the compound may be acted on by hydrogen, evolved by the action of ammonia on zinc, when acetylene unites with two additional atoms of hydrogen, in the nascent state, *i. e.*, just at the instant of generation, when they are more ready to combine than after they have assumed the free gaseous condition. We have now got Ethylene, one of the constituents of coal gas, C_2H_4. (See Fig. 7.)

We can make this gas unite with the elements of water by first dissolving it in sulphuric acid, then diluting with water, and distilling, when the substance $C_2H_6O_2$, ordinary alcohol, is obtained.

By further exposing the vapour of alcohol to a red heat, in a porcelain tube, we get a series of compounds richer in carbon, formed by the condensation of several simple hydro-carbon compounds into one molecule.

First, there is a series formed by the successive addition of CH_2 (Fig. 4) to Marsh Gas, another constituent of coal gas, which can also be formed from its simple elements. Another series is formed from ethylene, by the successive addition of CH_2 (Figs. 8, 9). Other series have the carbon more condensed; such is the series of which Benzol, C_6H_6, is the head (Figs. 10, 11), from which most of the brilliant new dyes have been prepared.

Other dense hydro-carbons are mentioned in the diagram.

Each of these hydro-carbons is the starting-point of a great variety of substances, obtained from them by substituting other elements, or even complex groups, for hydrogen; for it is often possible to get some elements or groups into union with carbon, by replacing hydrogen which is already in union with it, although they will not combine with it directly.

A valuable dye, Alizarin, the colouring principle of Madder and Garancin, and the only one which forms good reds (Turkey red), and purples, available for printing upon cotton goods, has been for more than twenty years the object of repeated attempts to imitate the processes carried on in the tissues of the madder root (*Rubia Tinctoria*).

Analyses led to the formula $C_{10}H_6O_3$, as expressing the proportions of the constituents; but no evidence had been obtained as to the degree of condensation, so that any other formula, expressing the same relative proportions of

C H and O might be the true one. The general belief, that it had a 10-carbon formula, led experimenters to start from the 10-carbon Hydro-Carbon Naphthalin $C_{10} H_8$ (Fig. 12), a substance which is deposited in gas pipes, and of course occurs in coal tar. A specimen is on the table. Several operators succeeded in producing from Naphthalin substances similar to Alizarin, but none of these gave the brilliant hues of the true dye.

Last year, two chemists in Berlin, Graebe and Liebermann, obtained from Alizarin, by distillation with powdered zinc, a substance with which they were acquainted, Anthracene. They knew that it contained fourteen atoms of carbon, and they inferred that Alizarin contained at least $C_{14} H_8 O_4$, figures which agree with the results of analysis, as well as the old formula which we find in books, $C_{10} H_6 O_3$.

They accordingly attempted to produce a substance having this composition from Anthracene, $C_{14} H_{10}$ (Fig. 13), of which a specimen is on the table. It is of a pale yellow colour, crystallises in flakes, and is obtained by distilling asphalt with superheated steam. Their efforts were crowned with complete success, and all coal-bearing countries are now no longer dependent upon warm madder-growing countries for their supplies of this valuable dye.

Starting with Anthracene, they oxidised it by any of the ordinary methods, as by heating with potassic bichromate and sulphuric acid.

In any case, this beautiful yellow crystalline substance, of which several specimens are on the table, is obtained—Anthraquinone. It consists of anthracene, in which two atoms of hydrogen have been replaced by a double atom of oxygen (Fig. 14), $C_{14} H_8 O_2$.

If we now replace two more atoms of hydrogen by the group H O, Hydroxyl, we get the substance required (see diagram). A general method for effecting this substitution has long been known, viz., by first replacing H by Br directly, and then replacing this by H O, by the action of caustic potash. This was the method adopted by Graebe and Liebermann, and I have found that it can be applied with great ease. On heating Anthraquinone with Bromine, there is formed Bibromanthraquinone (Fig. 15), a crystalline substance, of which there is a specimen in the sealed tube; then, by boiling this with potash, the bromine is removed in union with potassium, while Hydroxyl, two atoms, take its place, forming Alizarin (Fig. 16). It is soluble in alcohol and alkalies, as you see, and is precipitated by acids, and behaves in every way as the natural product. The spectrum absorption-bands of the two are identical.

These diagrams are not merely imaginary formulæ; although the mode of grouping is imaginary, yet the diagrammatic representations show the relations of the atoms, and the changes which take place in the several reactions; and they represent the relative amount of matter condensed into one volume of the different substances. The substances which they represent are on the table before you, and have been proved to have the composition indicated.

And now we see how deeply commerce and manufactures are interested in attentively following the progress of science. Since the discovery of the true structure of Alizarin, last Spring, three patents at least have been taken out for its production ; and several manufacturers are busily engaged in making it. One firm employs a cheaper method than that with bromine, for effecting the second change: the Anthraquinone is dissolved in sulphuric acid, and treated with potash at 180° C. On the small scale, I find it difficult to succeed by this method; the colour produced is not true Alizarin, since the cloth dyed with it does not assume the brilliant tints which it does when either the natural product, or the artificial substance prepared by the first method above-mentioned, is employed.

As an instance of new species produced in imitation of nature: here is a new alkaloid produced by Dr. Matthiesen.

Morphia consists of $C_{17}\,H_{19}\,N\,O_3$. It is narcotic; is insoluble in ether and chloroform. When sealed up with twenty times its weight of hydrochloric acid, and heated to 300° for some hours, there results the black resinous mass which you see in the specimen tube. When this resinous mass is dissolved in water, and treated with sodic carbonate to separate the alkaloid, there is precipitated a substance which is soluble in ether. The etherial solution, when decanted from the impurities, and treated with a drop of acid, deposits the salt, of which a specimen is here sealed up in a test tube. It is rapidly acted on by the air, which oxidizes and darkens the white salt. An etherial solution of the pure alkaloid becomes green on exposure, as you will see in one of the test tubes. From its origin, this alkaloid is called Apomorphia: and it differs from morphia by elements of one molecule of water, the composition being $C_{17}\,H_{17}\,N\,O_2$. It possesses the useful, though disagreeable property, of causing vomiting when taken in $\frac{1}{4}$th-grain doses, and causes no prostration nor after ill effects. Probably the great proneness to oxidation is the reason why we have not heard more about it since its discovery.

These are instances of the power which the chemist has over the elements, to mould them into forms interesting and useful to mankind. Allow me now to make a few remarks on the limits of this power.

Since by means of the physical forces we are able to do all that living organisms can do, in the way of constructing chemical compounds, is it a logical conclusion that the so-called "Vital force" is nothing more than a peculiar manifestation or grouping of the Physical forces? Surely not. It is, indeed, quite true, as Dr. Carpenter has shown, that there is a correlation between vital and physical forces: that, in fact, the cell converts the external physical forces, especially heat, into vital actions, "and that, therefore, all these forces are but different modes of action of one and the same agency, which, operating through inorganic matter, manifests itself as electricity, magnetism, light, heat, &c.; and, operating through organised structures, effects growth, development, chemico-vital transformations, and manifests itself as nervous energy and muscular power."

But whence this power of so directing the physical forces that they shall manifest themselves in a manner which they never do in the absence of living cells? Does it not indicate a "directive power," which is an invariable constituent of life, over and above the physical forces? The case stands thus:—Human hands, guided by human intellect, can, with certain materials, and with the physical forces as instruments, produce certain results; and living cells, guided by the unknown directive principle of life, can, with the same materials and with the same forces as instruments, produce the same results. The logical conclusion surely is, that the human intellect and the principle of life have a common origin or cause, which is beyond the region of the physical forces. If we wish to know the nature of this power, and ask Physics, as some leaders of popular thought bid us, Physics cannot tell. If we ask Metaphysics, it cannot tell. We must seek information elsewhere.

But living organised matter gives other evidence of the presence of a power which we do not find in matter acted on by physical forces merely. *It can produce other living matter like to itself.*

Professor Huxley's question, in the notorious Edinburgh address, "What justification is there for the assumption of the existence in the living matter of a something which has no representative or correlative in the not living matter which gave rise to it?" has been so freqnently and easily answered, that I am almost inclined to apologise for alluding to it. If we follow the methods of experimental enquiry expounded by Mr. J. S. Mill, in his *Logic,* the case comes under his third canon, which he enunciates thus:—"If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance, the circumstance in which alone the two sets of instances differ is the effect, or the cause, or a necessary part of the cause, of the phenomenon." The phenomenon in question is the production of living organised matter; the instances in which it does occur are under an infinite variety of circumstances, but have always one circumstance in common, viz.—the presence of life in a living organism. In another set of instances, we have matter acted on by the physical forces in any variety of ways; but so long as no living organism is introduced, the dead matter never becomes organised, nor does it live; the logical conclusion is, that previously existing life, over and above the physical forces, is a necessary part of the cause of living organised matter.

EXTRAORDINARY MEETING.

ROYAL INSTITUTION, 17th January, 1870.

JOHN BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

The Meeting was called pursuant to a notice given at the previous Meeting, and the following paper was read:

ON THE UNSUITABLENESS OF EUCLID AS A TEXT-BOOK OF GEOMETRY.

By the Rev. JOSHUA JONES, D.C.L.,

PRINCIPAL OF KING WILLIAM'S COLLEGE, ISLE OF MAN,
LATE SENIOR MATHEMATICAL, AND JOHNSON MATHEMATICAL SCHOLAR, OXFORD.

Among the various questions raised by the great educational movement of our times, not the least important is that of the merits, or demerits, of Euclid, as a text-book of Elementary Geometry. As far as mathematicians are concerned, it is a question of the greatest interest. The subject, although only quite recently beginning to be fairly brought forward and discussed among ourselves, is by no means a new one. Two centuries ago an attempt to amend Euclid was made in Italy by J. Alphonso Borelli, who published a work under the title of *Euclides Restitutus.* It is now more than one hundred years since, both in our own country and in Germany, Euclid was assailed, and efforts made to provide a substitute. Years ago the subject has been fully considered in France and other parts of the continent, and Euclid with one voice condemned and abandoned. The matter of wonder is, not that the question is beginning to excite interest among ourselves, but that it should have been allowed to remain so long dormant. At last, however, it can be no longer set aside; the dissatisfaction hitherto latent is concentrating and gathering strength; the struggle is fairly commencing; and the defenders, if their position be tenable, must be prepared for defence, as the assailants are already marshalling their forces for the attack.

The whole question has been lately brought into prominence by the Report of the Schools Inquiry Commission. There it is suggested as a subject "well worth consideration whether Euclid be the proper text-book for beginners."* To give weight to this suggestion, reference is made to the evidence of Mr. Griffith, Assistant Secretary to the British Association, and a Mathematical and Natural Science Lecturer at Oxford, who "stated that in his opinion many boys had read six books of Euclid, who knew nothing of Geometry;" and to that of Professor Key, who "went so far as to express a wish to get rid of Euclid altogether, as a most illogical book." To this we may add the opinion of Professor Sylvester who, as President of the Mathematical and Physical Section of the British Association, (*Exeter Meeting*, 1869,) expressed a wish that Euclid was "buried 'deeper than did ever plummet sound,' and out of the school boy's reach." The existence, however, of a wide-spread, deep, and increasing conviction, unfavourable to the retention of Euclid,—and the fact that we alone retain it as a text-book,—are in themselves circumstances sufficiently important to render investigation as to the grounds of our holding so unique a position desirable, and even necessary.

The defenders of Euclid as an elementary text-book may be fairly called upon to justify their position. The presumption is at once strong against them, as will probably be allowed by any one who takes into account the following considerations.

(1.) Euclid has been abandoned on the Continent, and nearly so in the United States; we alone retain it. Are we alone right, and all the rest of the educated world wrong? It may be so; but strong evidence in support of such a view should be forthcoming.

(2) Euclid's *Elements* were written two thousand years ago. During that time Geometry has shared in the great progress of other branches of science; geometrical investigations have been eagerly carried on; new principles have been introduced, or at all events old ones have been presented in a new light;

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* *Report of Schools Inquiry Commission*, vol. i., p. 30.

the science has been regarded from higher, or more far-reaching, points of view; the exigencies of advancing knowledge and civilisation have called forth wider applications; the experience of teachers for twenty centuries has been accumulating, and suggesting changes of method. Here is a book, written in the infancy of the science; before all its principles were fully discovered, and all its departments fairly reviewed; when therefore no general view of it as a whole could be taken, no logical arrangement of its facts and conclusions was possible, and no grasp of it as a whole could be secured. And yet it is just these very points, width of view, comprehensiveness of grasp, precise and logical apprehension of principles and facts, added to practical acquaintance with the capacity and mode of working of immature minds, and of the phenomena thence resulting,—an acquaintance only gained by experience in teaching,—which are the most essential qualifications for the author of a good elementary text-book. In the time of Euclid, the science was not sufficiently advanced to enable any one to possess these qualifications; and therefore such a book could not have been written. However highly valuable, then, as a treatise on Geometry Euclid may be, there is a *primâ facie* case against its use as an elementary exposition of the science.

One would think it to be a matter of the plainest common sense, needing no argument, that the progress of a science necessarily entails a reconstruction of its basis, and a revision and rearrangement of the truths selected for elementary instruction. Who, in any other branch of exact or experimental science, would dream of using as a text-book for beginners a treatise written only a hundred years ago? We avail ourselves of modern improvements in every other department of human learning; why in Geometry alone are we to remain stationary, and set aside the accumulated knowledge and experience of mankind?

(3.) Euclid's work was probably never intended for an elementary text-book, but composed for quite a different purpose. Whether it was with the object of "shewing his contemporaries that a connected system of demonstration might be made without taking more than a certain number of postulates out of a collection"*; or "with a view to meeting all possible cavils"; it was certainly "not with a view of developing geometrical ideas in the most lucid and natural manner."† Now this is just what an elementary text-book should do. Therefore, whatever may be the merits of the book in other respects, it must be unsuitable for teaching the elements of the science to beginners; a purpose for which it was not intended, and was probably in Euclid's time never used.

Until a satisfactory explanation be given on these points, the case against the advocates of Euclid seems so strong, that all further argument may be deemed unnecessary. But their opponents are obliged to act on the offensive. Euclid has possession of the field; it has the advantage of a long historical tradition, and pretty nearly, as far as our country is concerned, undisturbed possession in its favour; it is entrenched by the arguments of that narrow conservatism, which thinks that whatever we and our fathers and forefathers have been accustomed to must be best; it is defended by the same weapons, which have resisted all progress and reform, political and social, as well as educational. We know Euclid; we know but little, or nothing at all, of any other geometrical text-book; none of us are quite satisfied with it; we all, more or less, admit its many faults; but still, from force of custom, we think it the best book attainable; call it prejudice, or "postjudice,"‡ or what you like; the question is decided at once by most people without examination; and Euclid is retained. In such a case the party of progress and reform must not be content to remain quiet, resting on the goodness of their cause, and the weakness of their adversaries' position; but must be prepared to use actively and vigorously such means as lie in their power tc carry their point. Nowhere perhaps is this inert force of prejudice stronger than in matters of education; it meets us, who are striving after improvement, at every turn, resting as a dead weight upon progress, and impeding our efforts to attain to a better state of things. Rash and ill-considered innovation,—change for the sake of change merely,—cannot be too strongly condemned. But in the stolid opposition, which supports institutions, or practices, simply on the score of long usage, in defiance of the expansion of human ideas and the growth of human experience, it is hard patiently to acquiesce.

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* Smith's *Biog. Dict.*, art. "Eucleides," p. 68, a.

† Mr. M. Arnold's *Report to School Inquiry Commission*, vol. vi., p. 507.

‡ *Athenæum*, July 18th, 1868, p. 72, where the word is defined "a clinging to past experience, often longer than is held judicious by after times."

It must be remembered at the outset, that the attack is against Euclid as an elementary text-book, not as a scientific treatise; though necessarily in the course of our argument much that affects it in this latter respect will be said. This, however, is merely incidental, and not part of our design. Nor is it our purpose to call attention to the many merits of the book; that these exist will of course be freely admitted; that they are as numerous as is generally supposed may be perhaps doubted. It has been even suggested that these very merits are such as partly to disqualify it for the purpose of an introduction to the study of Geometry.

We now proceed to discuss the faults of Euclid, which for the sake of clearness we shall classify under these four heads:—1. Phraseology. 2. Method. 3. Matter. 4. Particular doctrines.

I. Phraseology.

(1.) He is verbose. This defect is particularly manifest in his definitions, where he sometimes endeavours to explain an idea in itself simple by a circumlocution, which adds nothing to its meaning. Thus the idea of a straight line is sufficiently clear and intelligible *per se*; while Euclid's definition of it as "that which lies evenly between its extreme points," not only adds nothing to the clearness of the conception, but is in itself "unintelligible."* The definition of a plane surface is open to the same objection; no one, who had not previously some idea of what a plane surface is, would gather any notion of it from Euclid's so-called definition. Again in the propositions, when the argument should flow on naturally and simply, it is often impeded and confused by a needless mass of verbiage. Instances of this are numerous, and are chiefly attributable to the next-mentioned defect, with which this one is closely allied.

(2.) The language is stiff and formal. The thought is frequently obscured, and the reasoning apparently to no purpose dragged out, with a view to maintaining the same rigid formality of expression. And so what is actually very simple frequently seems to the young learner difficult, and sometimes altogether unintelligible. He cannot understand what it is all about; and fails for some time at least to detect any meaning beneath the grotesque, and to him unwonted, phraseology.† He becomes weary; his grasp of the whole argument is impaired, and even not unfrequently altogether lost. From this cause we have often known boys fail in some of the most simple propositions, where the reasoning lies in a small compass, but the language is lengthened out, for the purpose of reducing the argument to a given set form.

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* Lardner's *Euclid, in loc.*

† Cf. J. M. Wilson's Paper on *Euclid as a Text-book of Elementary Geometry:* "The Geometrical facts are generally simple, but are disguised and overlaid by the formality of the diction, which to most boys is barely intelligible. It is long before most boys succeed in detecting the geometry beneath the strange phraseology."—*Educational Times*, Sep. 1st, 1868, p. 127.

It must be remembered that this and the preceding defect are very serious, inasmuch as they are subversive of our special object in teaching Geometry, which is to get ideas into boys' heads, and not words.

(3.) The nomenclature is antiquated,—often infelicitous,—and does not meet the requirements of our present advanced stage of geometrical knowledge. Thus Euclid has no such words as locus, superposition, &c. Even modern treatises on Geometry may be improved by an augmented stock of appropriate words.

(4.) When a word is once used in a certain sense he has no notion of modifying or generalising its use in any way, though the necessity of the case may require it. This is especially noticeable in his treatment of angles. Having once set out with the conception of an angle as "the sharp corner made by the meeting of two lines,"* he never entertains the idea of an angle equal to, or greater than, two right angles, even though, as we shall see in the sequel, his reasoning may be simplified, or widened, in its application, by such an extension of meaning. Whatever may be the reason for this,—"whether it was an oversight"; or because he "thought the extension one which the student could make for himself;" or whether, as the same writer suggests, it was an error left uncorrected, because "the *Elements* were his last work, and he did not live to revise them;"†—the defect is one of great moment, and fraught with injurious consequences.

II.—Method.

(1.) Euclid's method is impaired by the undue limitation of his first principles. Instead of dealing with his subject naturally, and taking for granted at the outset all the first principles, which the common sense and universal experience of mankind would allow to be necessarily true, and then using them in their fullest scope, he arbitrarily selects a few,—and those sometimes needlessly narrowed,—and constrains himself to develope his subject from these alone. We have already referred to the suggestion, that it was probably his express purpose to "shew how little need be assumed," and on how small a number of necessary data the science of Geometry may be based.* Now though it may be useful to have "one branch of study in which the consequences are evolved from the smallest possible assumption of premises,"† yet these should be sufficient for the natural evolution therefrom of all the facts of the science, which otherwise will be unduly narrowed and constrained. That Euclid's treatment of Geometry is open to objection on this score admits of no doubt. Thus the 3rd Postulate is an instance of a first principle needlessly restricted. Instead of allowing a free use of the compass, and granting that its legs can be opened so as to measure any given length between their points, he only assumes that when the legs are opened so as to form any angle, if the extremity of one leg be fixed at a certain point, the extremity of the other may be made to trace a circle round that point as centre. Remove this restriction, and Propositions I. 2. and I. 3. become unnecessary. The development of a science from principles thus limited may be an exhibition of intellectual ingenuity, but can hardly tend to promote natural order, or precision, in its exposition.

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* Smith's *Biog. Dict.*, art. "Eucleides;" vol. ii., p. 65, b.

† *Ibid.*

(2.) Another fertile source of confusion is the "rejection of hypothetical constructions," *i.e.*, refusing to examine the properties of a figure, before the construction of it is actually effected; or declining to recognise the existence, and reason upon the properties, of a point and line, before the methods for finding the one and drawing the other have been investigated. For example, although it is perfectly obvious, that every line has a middle point, and one only, and any reasoning based on this hypothesis would be legitimate, Euclid would not recognise this fact until he had shown how to find it. This is the cause of much disorder in the arrangement of thoughts, and confuses their natural order; the proper sequence of theorems is thereby disturbed; while the solutions of problems are often rendered inelegant, and of no practical value, because they have to be effected prematurely, before the properties of the figure have been sufficiently studied, and those best adapted for the construction selected. And so no proper classification of the science is possible. As Mr. Wilson, in the excellent paper before referred to in these pages, aptly says,* "if chemistry were taught under the condition that no material was to be used which had not been previously constructed and chemically examined, so that silicates must be studied before glass is used for collecting oxygen, the restriction would scarcely be more damaging to the scientific study of chemistry than this is to the study of geometry." It is plain that no science, hampered with such a restriction, could be expounded in a simple, precise, and orderly manner. Its exposition must be more or less clumsy and unnatural. And so, as a matter of fact, we find that Euclid is frequently involved in unnecessary difficulties, and his whole method made unpractical, and even irrational.

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* Professor Hirst's *Preface to Wright's Elementary Geometry*, page vi. "A main object with Euclid appears to have been to shew how little need be assumed in Geometry, and how much that is obvious as well as obscure may be demonstrated, and that too under difficulties which are never encountered, and in spite of restrictions which are never imposed."

† *Athenæum*, August 22nd, 1868.

(3.) Another defect is the neglect of the method of superposition, of which the *Athenæum* reviewer admits

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* *Euclid as a Text Book of Elementary Geometry.—Educational Times*, Sept. 1st, 1868, p. 126.

"Euclid might with advantage have made more use."[*] Now supposing it were at first a question, whether this moving of figures, without change of form or magnitude, and placing them bodily on others, be a legitimate kind of geometrical proof or not; yet when once admitted as valid, there can be no reason why it should not be used wherever it answers best.[†] Euclid allows, and rightly so, its validity, by using it in I. 4, and I. 8; and yet he makes no use of it in I. 5, and I. 26, where it is equally applicable, though thereby the demonstrations of these propositions would be much simplified, and their length and difficulty entirely vanish. So again he neglects to employ superposition in VI. 4, which might thereby be immediately deduced from VI. 2. The truth is, that so far from this method being questionable, it is, in the case of geometrical magnitudes, the ultimate criterion of equality and inequality to which the mind naturally refers, and which, consequently, in most cases, we employ.[‡] Euclid has seen this, and laid it down in Axiom 8 as the special test of equality of magnitude. To ignore it, then, is to strike at one of those elementary mental processes on which geometrical truth ultimately rests; and, at the same time, to occasion an unnecessary separation between our scientific and practical geometrical methods.

(4.) His system is impaired by the exclusion of arithmetical considerations and processes. This is doubtless due to the defective state of arithmetical notation in his time, but it is none the less fatal to the due exposition and progress of the science. Some geometrical doctrines, *e.g.*, that of ratio and proportion, as we shall subsequently explain, and most questions relating to the area of figures can be much simplified by the introduction of arithmetical ideas and modes of working.* Indeed, without the assistance of Arithmetic, many important practical applications of Geometry are impossible. Nothing is gained by rigidly excluding such aid altogether; on the contrary, the only result is, that the Geometry learned theoretically is useless for practice, and another Geometry has to be acquired by practical men; whereas the theoretical and the practical branches may be made much more identical than they at present are. It must be remembered that this is no matter of proving geometrical questions by algebraical or arithmetical methods. The science of Geometry would still rest on its own principles. But in the present advanced stage of progress of the sciences, which renders their intermixture at certain points of contact inevitable, nothing is gained by attempting to keep each entirely separate from all others. It is far better from every point of view so to treat them, that they may shed mutual light on one another. Without this, neither can Geometry, nor any other science, be freely and fully developed, nor attain to the utmost reach of its power.†

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[*] *Athenæum*, Sept. 22nd, 1868.

[†] Professor Hirst's *Preface to Wright's Elementary Geometry*, p. viii. "No valid reason can be assigned why superposition, as a test of equality, should not be applied whenever it best serves our purpose."

[‡] Lardner's *Euclid*, p. 11. "In the most ordinary practical cases we use this test for determining equality; we apply the two things to be compared one to the other, and immediately infer their equality from their coincidence.

(5.) Euclid is objectionable as an elementary treatise, because not the slightest explanation is ever given, why any particular course is adopted.‡ The student notices a considerable amount of pains taken, and sees a large number of words used, which to him perhaps seem unnecessary, because he has no conception of the particular difficulty in the author's mind, and has no idea of the object at which he is aiming. A hint as to this would often aid the young beginner in his apprehension of the course of reasoning; at all events, would prevent his regarding what he is learning as meaningless, or needlessly tedious. This fault alone, however meritorious and worthy of study the treatise may be in other respects, makes it unsuitable as an introduction to the study of Geometry.

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* Reynolds' *Elementary Geometry*, p. 58.

† Todhunter's *Euclid*, Appendix, p. 335. "The power of the modern methods is obtained chiefly by combining arithmetic and algebra with geometry."

‡ Smith's *Biog. Dict.*, art. "Eucleides," vol. ii., p. 66, a.

(6.) A sixth objection to Euclid's method is the absence of any proper classification. This is mainly due to some of the defects previously discussed, as in the case of one of them was hinted.* In fact his treatment of his subject is forced and artificial; the natural order of ideas is involved, or inverted; and though some kind of classification is attempted to be made out by some writers, it is constrained, and not in accordance with the regular and rational arrangements of the principles and facts of the science. Indeed no principle of classification worthy of the name can be discovered in the book; propositions are arranged neither according to their relative importance, nor according to any really subsisting relations among themselves, nor with reference to their due position in the orderly development of the science. Take for instance Book I. Properties of the single triangle, and of two compared triangles,—of lines and angles,—of parallels and parallelograms,— of equal and equivalent figures,—theorems and problems,—are all mixed together in confused medley. There are no salient points ; there are no indications, either from position, or arrangement, or otherwise, by which we can distinguish propositions of leading importance from those which are subsidiary, or of little consequence. And this is one of the reasons why those who have learned Geometry from Euclid have, as we shall subsequently see, so little notion of original work ; — their ideas are never concentrated on leading points, nor grouped around well arranged divisions of the subject.

Such fundamental defects as some of these are incompatible with the possibility of any annotated Euclid, or Euclid with a commentary, being, as by some has been suggested, a satisfactory elementary text-book of Geometry. They strike at the root of the matter, and necessitate the treatment of the subject, at all events for beginners, on different principles and by different methods.

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* *Vide supra*, p. 67.

III. MATTER.

(1.) In the first principles on which he bases his science, Euclid errs in other ways, and on the side of both excess and defect. Take the definitions. Some, *e. g.*, I. defs. 3, 6, 13, are statements, not definitions; others, *e. g.*, I. defs. 1, 2, 4, 5, 7, 9, are no definitions at all, for they do not explain their terms; others, *e. g.*, I. defs. 10, 11, 12, 14–17, 19–30, are mere verbal definitions; others are properly theorems, *e. g.*, I. def. 18, and III. defs. 1, 11.* Against I. def. 35, it may be urged that it is the statement of a negative, and not of a positive property; against I. defs. 4 and 7, that they are unintelligible.† Several definitions are wanting; *e. g.*, one explaining the distinction between equal and equivalent figures before I. 35: while others that are unnecessary, because never afterwards used, are introduced; *e. g.*, I. defs. 8, 26, 31–34, and III. def. 7. In the case of the postulates we have already seen how injuriously the 3rd is narrowed by not conceding the free use of the compasses; the others are similarly restricted by only allowing the use of a non-graduated rule. As regards the axioms, or common notions, the eleventh and twelfth are not self-evident but demonstrable theorems. For Axiom 11 Professor De Morgan proposes, "if two right lines coincide in two points they coincide when produced;" from which it follows, that "the doubles of all right angles are equal, and thence that all right angles are equal,"* which would come in as a theorem between I. 12 and I. 13. Other proofs of this so called Axiom have been given.† Of Axiom 12 we shall speak more fully hereafter. Against Axioms 4 and 5 it has been objected, that they are "not sufficiently definite."‡ Lastly, even the Axioms are not complete, as before I. 7 one is needed, which is never formally stated: "if two magnitudes be equal, any magnitude greater than the one is greater than any magnitude less than the other."§

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* *Companion to British Almanack*, 1849, p. 5.

† Lardner's *Euclid*, p. 3.

(2.) The *Elements* contain a considerable number of superfluous propositions. The list of these is so large, that only illustrations can be given. Sometimes we have the same proposition stated in different words proved over again. A remarkable instance of this is the case of III. 7 and III. 9; thus in III. 7 it is shewn, that from any point, which is not the centre, *only* two equal straight lines can be drawn to the circumference; in III. 9, that any point from which *more than* than two equal straight lines can be drawn is the centre. So again, VI. 30 is only II. 11 under another name.—I. 6 is not wanted until II. 4; and, instead of being placed where it is, may be easily demonstrated after I. 18, or still more simply after I. 26.—I. 7 is only required for the purpose of proving I. 8; and if the latter proposition were differently proved might be dispensed with.|| II. 2 and 3 are corollaries to II. 1.—II. 14 is never required, at all events in parts of Euclid usually read, and is included in VI. 25.—VI. 9, and VI. 11 are particular cases respectively of VI. 10, and VI. 12.—VI. 14 is a particular case of VI. 23.—VI. 15 is an immediate consequence of VI. 14.—VI. 17 is a par-

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* *Companion to British Almanack*, 1849, p. 6.

† Galbraith and Haughton's *Euclid*, p. 8,—Lardner's *Euclid*, p. 12.

‡ Lardner's *Euclid*, p. 12.

§ *Companion to British Almanack*, 1849, p. 7.

|| Todhunter's *Euclid*, notes *in loc.*, for this and the next following instances.

ticular case of VI. 16;—and the list may be indefinitely increased.

In no part of the work is this tedious superfluity more marked than it is in Books III. and IV. The whole of the ground of Book III. and something more, is included by Mr. Wilson, in his *Elementary Geometry*, in some ten or eleven theorems, and four problems. Under one theorem, viz., "the angle subtended at any point in the circumference by any arc of a circle is half of the angle subtended by the same arc at the centre," which answers to Euclid III. 20, he comprises as simple corallaries Euclid III. 21, and its converse, not proved by Euclid,—III. 31,—III. 22,—III. 26, and its converse III. 27,—besides an important theorem respecting the angles in supplementary segments.—III. 26–29, may easily be thrown together under one proof; because in equal circles if either of the three pairs of arcs, chords, or angles be equal, all the other parts are necessarily equal,—III. 18 adds nothing to what has been proved in III. 16.* By an appropriate definition of internal and external segments, III. 35 and III. 36 may be thrown together under one enunciation: "if two chords cut one another, the rectangles under their segments are equal."† As regards Book IV., Mr. Wilson gives two constructions, for constructing in and about a circle polygons of an even and odd number of sides respectively, and two preliminary theorems; and we acquire therefrom a much more extended power of constructing regular polygons in and about circles, than we should ever get from Euclid's treatment of the same subject.

(3.) On the other hand, there are many important omissions. Here again we must be content with a few illustrations, which have been taken somewhat at random. Thus

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* Todhunter's *Euclid, in loc.*

† *Companion to British Almanack*, 1849, p. 11

Euclid omits the fourth case of the equality of triangles, where two sides and one angle, not included, are given equal, though subject to a certain restriction the triangles are equal. He omits also the converse to I. 15. After I. 11, he neglects to prove the property analogous to that in III. 7 and 8, viz., "the perpendicular is the shortest line that can be drawn from a given point to a given line; and of the rest, the line which is nearer to the perpendicular is less than one more remote: also only two equal straight lines can be drawn from the same point to the line, one on each side of the perpendicular." An important proposition, which should be in Book II., "the rectangle contained by the sum and difference of any two lines is equivalent to the difference of the squares on those lines," is wanting, though it would be useful in the demonstration of other propositions, and would include II. 5 and II. 6 as corollaries. Though the converse of III. 22 and of III. 32 are true and of great importance, Euclid takes no notice of them. In Book VI. the ideas of harmonic division, anharmonic ratio, &c. might have been introduced,* but are not referred to. It must be remembered, that these are but a few instances of a large number of omissions.

(4.) Not to go more into detail, we find proofs that may be simplified; *e.g.* I. 20, which is proved circuitously by means of I. 5 and I. 19, is capable of the most simple direct proof, if indeed it need any proof at all; I. 48 and III. 37 may be proved much more readily by using the indirect method; II. 9 and II. 10 admit of easy deduction from II. 4 and II. 7, instead of the long and tedious proofs which Euclid gives;† in III. 35, "the most general case of the proposition might have been first demonstrated, and the other more simple cases deduced from it,"‡—but, as the same writer goes on to observe, "this is not Euclid's method"; "he always commences with the more simple case and proceeds to the more difficult afterwards"; thus needlessly, we may add, augmenting the task of the student. We have imperfect proofs *e. g.*, I. 24 and VI. 22; possible extensions neglected, *e. g.*, I. 46, which might easily have been extended to the construction of a rectangle with given sides; and other defects in detail, which it would be tedious to enumerate, but by which conciseness, elegance, and often clearness, are utterly sacrificed.

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* *Companion to British Almanack*, p. 17.

† Potts' *Euclid, in loc.*

‡ *Ibid.*

IV. PARTICULAR DOCTRINES.

(1.) Angles.

The definition, on which Euclid bases his treatment of angles, is narrow and inadequate. As we have already stated, he starts with the conception of an angle as "the sharp corner made by the meeting of two lines," and never entertains the idea of two right angles making one angle, or of the existence of an angle greater than two right angles. The results of this restriction of the definition are most unfortunate.—I. 13 and I. 14 would be unnecessary, if the view of an angle was wide enough to include one of the magnitude of two right angles. In Book III. the evil of this narrow conception is especially patent.—III. 20, which is only partially proved, viz. for the case where the angle at the circumference is less than a right angle, if the definition were sufficiently wide, could be shewn to be universally true; and then III. 31 becomes an immediate consequence of it, and does not need an independent proof; III. 21, becomes simplified, because both the cases may be included under one proof; and III. 22 admits of the most easy demonstration. In VI. 33, though no notice is taken of the fact, Euclid, under the obligation imposed by his definition of proportion, gives up his restricted view, and other;" and when in def. 5, he uses the terms "equimultiples," "multiples," he seems to introduce an arithmetical idea;* when a magnitude is "multiplied" it is doubled, or trebled, &c., *i.e.*, the unit of magnitude, in the particular case, is added to itself two, or three times, &c.; for multiplication is only addition, repeated the number of times denoted by the multiplier. True, in Geometry, the unit is variable, and not fixed like the number unity in Arithmetic; but yet the idea of multiplication, or successive addition, is purely an arithmetical one. If then arithmetical notions thus lie at the root of the doctrine, why should they not be freely used in its application? The difficulty is occasioned by incommensurable magnitudes; but this may be surmounted by first proving the given proposition for commensurable magnitudes, and then passing on to the case of incommensurable, by help of the notion that two incommensurable magnitudes become commensurable, by adding to, or subtracting from, either a magnitude less than any given assigned magnitude, however small. It has been further objected to Euclid's definition of proportion, that it is utterly impossible to make trial of *all* the possible equimultiples of the first and third magnitudes, and also of the second and fourth; and also, that it ingeniously "avoids all questions of incommensurable magnitude, and deals only with multiples instead of parts."† Whether any better theory of proportion be possible, or not,—and we are aware that the negative is maintained by several eminent mathematicians,—Book V. is practically abandoned; and students are thus left without any preparation for Book VI., the study of which by them consequently becomes irrational, because there is no previous conception in their mind of the particular idea of proportion, which runs through it. Whatever, then, the substitute for Euclid's doctrine may be, whether it comprise arithmetical notions, or not, it must be better than having no doctrine at all,—in which position we are at present, owing to the almost universal practice of ignoring Book V.

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* Smith's *Biog. Dict.*, art. "Eucleides," vol. ii., p. 67, a — "A distinction should be drawn between Euclid's definition and his manner of applying it. Every one who understands it must see that it is an application of arithmetic."

† J. M. Wilson's Paper on *Euclid as a Text-book of Elementary Geometry.—Educational Times*, Sept. 1st, 1868, p. 127.

Though the existence of some, or all, of these defects in Euclid is more, or less, freely admitted, yet it is urged that we should still adhere to the book; and that what is wanted is an amended Euclid, with its "faults noted and commented."* Such is the course gravely recommended by writers of great ability and eminence. Now surely, with the pressure of work under which we are suffering in education, it cannot be wise to present a confessedly difficult subject to a learner in a very faulty form, and then require him to undergo extra labour, and expend more time, in studying notes and commentaries to correct those faults. Would there not be something more than a chance of the error remaining fixed in the mind, and the comment being forgotten? What classical teacher would think of teaching his pupils a grammar full of defects, and then set them to learn a commentary to correct those defects? Would not such a waste of time and energy be rightly regarded as unwarrantable? At all events, it seems to be a dictate of the simplest common sense, that it would be better to present any subject to the learner, even in a less perfect form, provided only that it be accurate and clear so far as it goes, than to so teach him, that he has at every step to add to, or amend, or substitute something else for, what he has laboriously learned. That it should be necessary for its advocates to make such a suggestion is in itself a sufficient condemnation of Euclid as an elementary text-book.

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* *Athenæum*, July 18th, 1868, p. 71.

So far, we have considered the theoretical objections to Euclid's *Elements*. We pass on now to view the matter on its practical side.

(1.) It is hardly possible to over-estimate the amount of discouragement which beginners feel in their study of Euclid. Our opinion, based upon no little experience, is that there is no branch of mathematical study in which young students take less interest than they do in geometry; and yet in itself it is capable of being made the most interesting of all. A student's interest in a subject is, for the most part, in direct proportion to the rapidity and certainty with which he is acquiring knowledge. If he finds that he is learning little or nothing, that his ideas of the subject are confused and his grasp feeble, that his progress, in short, is slow and uncertain, he becomes disheartened. How often this is the case with students of Euclid, the experience even of the best teachers can testify.

(2.) This result is due to the difficulty of Euclid, arising from the tedious length, and often unnecessarily abstruse reasoning of the propositions, and from other defects which have been already in these pages discussed. Now undue difficulty in a book, particularly if it be not inherent in the subject treated of, is sufficient objection to its use as an elementary treatise. Of course its abstruseness is not in itself a sufficient argument against any study; because this very characteristic may make it valuable as an educational instrument, by exercising and giving full play to certain powers of the mind; yet it never can be right to present a subject to a young beginner's mind in a hard form, when it is capable of being put before him in a more easy one. Such a course defeats its own object, by making that repulsive which may be made attractive, and by burdening and crushing, instead of strengthening and developing, the faculties. There can be no reason, then, why all unnecessary difficulties should not be removed out of the way of beginners, and not be allowed to disgust them at their first entrance upon the subject. Granting that difficulties are necessary for the purpose of mental training, they would be supplied in sufficient abundance by Advanced Geometry, to which there would be ample time to proceed, if Euclid were once abandoned, and a text-book of Modern Geometry substituted in its stead.

To illustrate this point, let any one compare I. 5 of Euclid with the same proposition, as proved with equal rigour, in Wilson's,* and other text books of Modern Geometry; let him then remember the torture which he underwent, and which, if he be a teacher, he has seen others undergo when called upon at the very outset of their geometrical studies, with minds utterly unversed in geometrical ideas, to face the formidable difficulties and complications, which have earned for it the title so well known to school boys; and he can hardly fail to realise the force of this objection.

(3.) As a matter of fact, in the majority of cases, boys who have learned Euclid have not learned Geometry from it. They may quite understand the course of reasoning,—they may comprehend the data and the process by which the conclusion is drawn from them,—they may be able to repeat accurately and intelligently all the propositions, and to write them out neatly and clearly, and yet they have acquired but a limited stock of geometrical ideas; they are but, as it were, on the outskirts of a wide field of knowledge, they have but a feeble grasp of geometrical principles, and little or no skill in applying them. And yet in other branches of mathematics, these same boys shew an intelligent acquaintance with principles, and much expertness and readiness in their application. I am only giving utterance to a conviction, formed after many years' experience as a mathematical teacher, and as a head master watching the results of mathematical teaching in others, when I say that boys fail to acquire from the study of Euclid any adequate idea of Geometry. This conviction is shared by others. Thus Mr. Wilson says,* "as every one knows, boys may have worked at Euclid for years, and may yet know next to nothing of Geometry"; and again, to the same effect, Mr. G. Griffith,† "many of the boys, who have read six books of Euclid, really know nothing at all about Geometry; they do not understand the simplest elements of it." Upon this point I believe there would be a singular unanimity of opinion on the part of all good teachers.‡ To any earnest-minded master it cannot but be most unsatisfactory to know that his pupils, while laboriously mastering their text-book, are yet of the subject itself acquiring only a very slight and superficial knowledge. To say that there must be something wrong in such a case is to utter the merest truism.

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* *Elementary Geometry*, p. 21.

(4.) This ignorance of Geometry is especially shewn in the fact, that boys who know Euclid thoroughly, fail, for the most part, in original work. The experience of other schoolmasters will, I feel sure, bear me out in this statement. We must all know intelligent boys, who understand and can repeat Euclid perfectly, and yet have acquired little, or no, power of dealing with problems and unseen questions. Let any one who has been in the habit of examining boys in Geometry recall his experience. I have frequently examined those who have been learning Euclid for years, and found them unable to attempt the simplest question or deduction outside of their text-book. In these cases I have had no reason to doubt the capacity, or energy, of the master,—as indeed I have sometimes had occasion to do, when I have found boys, who have been learning for months, unable to write out correctly and intelligently the simplest proposition,—because I have observed, perhaps, in other subjects their pupils to have been well taught and trained. This testimony is confirmed by that of Mr. Wilson,* "Everybody recollects how unavailable for problems a boy's knowledge of Euclid generally is": and again, in the paper† before quoted in these pages, "every one who has examined men or boys knows that no deduction, however easy, can be set which shall be even rationally attempted by all the examinees. I examine scores of boys of fourteen and fifteen, at our entrance examinations, and the answers show a kind of ludicrous inappropriateness, indicating that the two or three Books of Euclid, toiled through, have given no notion either of a proof of a theorem, or of a solution of a problem." ‡

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* *Elementary Geometry*, Preface p. ix.

† *Report of Schools Inquiry Commission*, vol. iv. p. 177.

‡ Cf. J. M. Wilson's paper on *Euclid as a Text-book of Elementary Geometry*.—"On this point masters are almost unanimous in asserting that few boys see through Euclid to the geometry that underlies it. I have great concurrence of testimony on this point. One eminent and successful master says that most boys learn *no* geometry from Euclid."—*Educational Times*, Sept. 1st, 1868, p. 127.

And yet all mathematicians would agree, that though to reproduce book-work accurately may be of value, yet the true test of mathematical knowledge is the ability to apply it to original questions; if this power has not been gained, no real mastery of the subject has been acquired. We certainly should not be satisfied with this state of things in other branches of exact or experimental science; if a boy, after spending four or five years on Algebra, or Trigonometry, or Chemistry, knew nothing but the matter of the text-book he had been studying,—and even then had but an inadequate view of the subject, and but little aptitude for applying its principles to the working out of unseen questions within the range of his knowledge,—we should think the result unsatisfactory. And yet that this is very largely the case with students of Euclid it is hardly possible to deny. There must be a fundamental defect somewhere.

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* *Elementary Geometry*, Preface, p. x.

† *Educational Times*, Sept. 1st, 1868, p. 127.

‡ Since writing the above, I have seen a further confirmation of this view in the Report of the Dean of the College of Preceptors, recorded in the *Educational Times*, for Feb., 1870.—"Few, however, even attempted the one or two very simple problems or riders given in addition to Euclid's propositions."

But it may be said, in answer to this objection, there is a fault here undoubtedly,—but it rests in the teacher, not in the book. In some cases it may be so; in many, nay in most, it is not so. We are not all bad teachers; those of us who are good teachers of Analysis, are not likely to be bad teachers of Geometry; and yet many, who are highly successful in the former capacity, comparatively fail in the latter. The results of our work in this respect are generally, almost universally, more or less unsatisfactory. Where is the fault? Now for successful progress in any study, two conditions, external to the student, are necessary—a good teacher, and a good text book. A bad teacher will diminish and mar the influence of a good text book; and assuredly a bad text-book will weaken, and, to some extent, nullify the efforts of a good teacher. Efficient instruction may supplement the deficiencies of the book, but cannot make up for them altogether. Now where the fault lies in this case we have no manner of doubt. Even if the teacher be bad, the book, in a great measure, makes him so. No one can be thoroughly successful in his geometrical teaching, with Euclid as the basis of his instruction. The book itself is enough to paralyse the efforts of any teacher. There is nothing in it to suggest the application of its principles to new questions, no salient points indicative of similar ones not discussed, no order leading on naturally from what is proved to what has not been, but may be, proved. The very form in which the book is cast, added to the utter absence of any reason for taking any particular steps, or following any particular arrangement, naturally leads both master and pupils to the idea, that the great thing required is to "get up" accurately, and "say" the propositions; and this task is so arduous and absorbing, that nearly all the master's and pupils' attention must necessarily be devoted to this point alone.

(5.) This last observation supplies the key to the explanation of the two preceding defects. The mastering of the text of Euclid takes up so much of the time that can be fairly allotted to Geometry, that but little is left for acquiring a more general knowledge of the subject than the book itself supplies, and for original work. The time now spent in mastering Euclid would suffice, if devoted to a modern treatise, for covering much more than his ground in Elementary Geometry, for learning a great deal of Advanced Geometry, Geometrical Conics, and acquiring, at least, an insight into Newton's *Principia* ; and would leave an ample residuum for problems, deductions, and general geometrical questions.

Against this it may be urged,—as indeed it has been,—"time is an essential element in education ; you must not be in a hurry; it is no argument against any study, that it occupies time." But surely there can be no reason for spending on any branch of study more time than it absolutely needs; if a boy could learn the same amount of Geometry in a shorter period, and not suffer in respect of mental discipline, or otherwise, no one in his senses, one would think, would say he ought not to do so.

The truth is, that in education at present it is absolutely necessary to economise time. The number of subjects which it is requisite for boys to study is so great, that an injurious strain has to be put upon them; and just complaints are being made, that we are overburdening our pupils with a multiplicity of studies. It is no use to say, then why not diminish the number, teach fewer, and try to teach them well? No doubt this would be best. But the pressure of public opinion, urging this variety of subjects upon us, now requiring the introduction of one new subject, and now of another,—the exigencies of civilised life in our age,—above all, the crushing requirements of the various examinations, for one or other of which our pupils have to be prepared, oblige us to do what our better judgment tells us ought not to be done. With our education already borne down in this respect, there seems to be but one alternative, and that is, to see whether any of the old subjects cannot be better taught in a shorter time, and with a less expenditure of mental force on the part of the student, by our simplifying them as much as possible, and improving, where we can, our methods of conveying their elementary truths. Unless this can be done, it may fairly be predicted, that our present system of education will break down; or, what comes to the same thing, our students will break down under it.

The general result of all this is, that while in other branches of education we are on a level with other nations, in Geometry alone we are decidedly inferior. I know this fact is denied; but in such a matter it is well to see ourselves as others see us. Mr. M. Arnold, who had ample opportunities of collecting the opinion of foreigners upon this point, thus expresses the general tenour of what he heard:* "In general, the respect professed in France for the mathematical and scientific teaching of our secondary schools is as low as that professed for our classical teaching is high. . . . I must not forget to add, that our geometry teaching was in foreign eyes sufficiently condemned when it was said that we still used *Euclid*. One of the great sins of Cambridge was her retention of *Euclid*. I am bound to say that the Germans and the Swiss entirely agreed with the French on this point. *Euclid*, they all said, was quite out of date, and was a thoroughly unfit text-book to teach geometry from. . . The foreign *consensus* against the use of *Euclid* is something striking." Now this testimony seems to establish these two points: first, that we are inferior to other nations in our geometrical teaching; and secondly, that that inferiority is due to the use of Euclid. It is all very well to say that this deficiency on our part is only "proved by French witnesses;"* that the testimony, in short, is foreign, and therefore to be suspected. Any evidence under the circumstances to be worth anything must be foreign, for we cannot be expected to give impartial testimony in our own case; at all events, others are more likely to be unprejudiced witnesses than we can possibly be. That this particular evidence is not altogether prejudiced is shewn by the fact, that while they condemn our mathematical, they recognise our superiority in classical, teaching.

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* *Report of the Schools Inquiry Commission*, vol. vi., p. 506.

But it is asserted in reply to all this,—though Euclid be open to all these charges; though it fail to teach Geometry, yet it supplies an admirable mental discipline, and in particular trains the mind to close, accurate, and consecutive reasoning. This may be all very true; but there can be no reason to doubt, that modern text-books of Geometry would train the reasoning faculties, and develope the general intelligence, equally well. The example of other nations would seem conclusive upon this point. We have no ground for believing that the Germans, French, Italians, and our brethren across the Atlantic, are in the power of precise and vigorous reasoning, and in general intelligence, inferior to ourselves. Indeed, the wider knowledge of the subject,—and the consequent greater insight into geometrical truth, and enlarged acquaintance with exact reasoning in different forms,—which would be acquired from a modern text-book, must, to some extent, involve a proportionately more extensive discipline of the reason, and a corresponding augmentation of its power.

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* *Athenæum*, August 22nd, 1868.

The truth is, that a good deal of nonsense is talked on this point; the acquisition of knowledge and mental training are rather separable in idea, than in fact. It is a mistake to suppose that the latter can be attained without the former; our aim should be so to conduct the process of the acquisition as to secure the training. In general, where the knowledge is worth acquiring, the discipline is in direct proportion to the knowledge acquired. So then, when it is suggested that the object in teaching Euclid is not to make men geometricians, but clear, cautious, and powerful reasoners, such a notion must be received with limitation. This may be, indeed, our primary object; but if, besides accomplishing this, the other purpose is attained as well, something more valuable has been effected. It must be better, one would think, to gain the mental discipline, *plus* a larger store of knowledge, than to secure the former with only the minimum of the latter.*

Again, even if we granted that Euclid by itself supplied a better discipline of the mind than any modern text-book, even with the increase of geometrical knowledge which the use of the latter implies, yet it can hardly be asserted, that it would be as effective in this respect as the modern treatise, together with the much larger amount of original work which, as we have already seen, there would be time to undertake, if Euclid were abandoned. By original work

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Professor Hirst's *Preface to Wright's Elements of Geometry*, p. viii. "We should seek as much as possible to combine intellectual discipline with effective advancement in knowledge, rather than continue striving to secure that discipline by exercises of a purely artificial and gymnastic kind."

logical power, and the faculty of close, accurate, consecutive reasoning, would be more effectively cultivated, than by the perpetual effort to comprehend, and exactly reproduce, the reasoning, however perfect, of another; while the faculties for originating ideas, the judgment, and to some extent even the imagination, would be called into active play.

It is further and gravely urged, that Euclid is "a better thinking ground" because of its very imperfections;* they supply something to "reason against" and to "remedy;" they engender cautiousness; and, in short, it cures the student of a "hasty habit, if he be properly exercised in the very field of danger — a student trained in accuracy without ever hearing of falsehood is a drilled soldier who has never been under fire."† To carry on the metaphor, it must be remembered that the soldier is drilled on the parade ground, and not on the battle field; and if from this "field of danger" some come out unscathed and victorious, many are wounded, or fall to rise no more. May it not be so with the intellect trained under such hazardous circumstances? Dropping metaphor, we may safely say, that it is dangerous to throw undue difficulties in the way of immature, undeveloped minds. Intellectual discipline is best secured by the gradual exercise of the faculties on matter suitable to their growing, but not yet full grown, powers; they are enfeebled, often crushed, or never exercised at all, by being overburdened in their first efforts. The reasoning powers are much better developed by clearly grasping at each step the force of the premises, and the connection between them and the conclusion, than by taking for granted without understanding them, as young beginners often must do, the different processes by which Euclid works out his results. No doubt the mental faculties, for their due expansion, must encounter difficulties; but these should be at each stage of their development proportionate to their strength. A man can bear a burden, which would overweight and crush a child; give the child a weight to carry, adequate to its physical powers, and those powers are gradually stengthened. It is important, then, that the text-book, certainly at first, should not present difficulties, disproportionate to the average student's capacities, and a course of reasoning which he can hardly grasp.

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* *Athenæum*, July 18th, 1868, p. 71. "So splendid and so unique an exhibition of human greatness and weakness mingled would, with proper advice as to correction, be a better thinking ground than concinnate perfection, in which the learner is kept out of the way of imperfection, instead of being introduced to it to the reasons against it, and to the remedy."

† *Ibid.*, p. 72.

It may seem like heresy to say so, but it is at least questionable, whether the study of Euclid is such an excellent training for the reason. The type is not so perfect. True, his argument is ever faultless, inflexible, incapable of reply; but it is conveyed with an unnecessary prolixity and verbosity, and with a stiffness of form, which we certainly never find in other scientific reasoning, or in that of common life. Reasoning after Euclid's fashion would be something like dancing in armour, or on stilts; it would be very wonderful as a performance, like that of an acrobat; it may give an unnatural strength to certain limbs and muscles, but it would not tend to the general development and health of the whole frame; it would be hardly graceful, or worthy of imitation; and after all it would be more useful to learn to walk steadily and without stumbling. Teach a boy to reason by all means, but teach him to do so naturally and simply; and do not force his reasoning into a set and artificial form, which as a matter of fact it would never, if freely exercised, take. In the culture of this, as in that of all our other faculties, the great object should be to be natural, and not constrained and artificial.

But it is suggested, that the study of Euclid is a good mental discipline, because it is useful to have "one branch of study, in which the consequences are evolved from the smallest possible assumption of premises."* This we have seen to be a defect of Euclid; here it is assumed as a positive merit. Now as a matter of fact in scientific matters generally, and in common life, we seldom if ever try to reason from "the smallest possible assumption of premises." On the contrary, we are wont to draw our premises from all quarters; to assume our *common notions* freely, wherever we find them established and admitted; and then to deduce our conclusions. So this merit, or defect, — call it which you will, — of Euclid, does not make it a good type of reasoning for any purpose in life.

The truth is, that our teaching of Geometry through Euclid "appeals more to the memory than to the intelligence of the pupil."† It involves very little more than a mere recitation of certain constructions, data, and conclusions; even when the whole process of the argument in each case is thoroughly understood, the memory is exercised rather than the understanding. It is just a question, whether the perpetual "saying" of propositions does not enfeeble, rather than invigorate, — stunt rather than expand, — the reason; it seems almost certain, that it has a tendency, as has just above been suggested, to force that faculty into a distorted form, rather than encourage its natural and full development. This is a heavy indictment to bring against any study; but that the study of Euclid has this effect in numerous instances we are strongly inclined to believe.

At all events, the constant repetition of propositions, with little or no original application of them, can hardly fail to crush originality, and make the mind reason in a groove, rather than of its own impulse and independently. And this is just the great defect of so many cultivated minds, that they are ever thus running in a groove; able to master thoroughly and reproduce accurately facts, or the conceptions of others, but unable to originate ideas, or work freely in the great world of thought and knowledge. To it is owing the circumstance that works of genius are so often produced by men, who have not been subject, or have refused to blindly submit themselves, to the course of culture marked out by our Universities and Schools. The evil here referred to is on the increase. Men, under the baneful influence of competitive examinations, are becoming less and less original. That the study of Euclid has to some extent contributed to this injurious result is more than probable.

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* *Athenæum*, Aug 22nd, 1868.

† MM. Demogeot and Montucci, *Report on English Education*, quoted in preface to Wilson's *Elementary Geometry*, p. ix.

Let not our meaning be mistaken. We do not undervalue geometrical studies; on the contrary, we regard them as the best possible discipline of the reasoning faculties. Our quarrel is with Euclid, as a text-book of Geometry,—not with Geometry itself. We would have this study maintained, and even extended, as we would have classical studies upheld, as together forming the basis of liberal education. But, as in the latter case we should like to see an improvement in our methods of teaching and in our text-books, so we wish for the same in the former. That the results in the way of intellectual discipline from Geometry, thus studied on a better system, would be far more satisfactory than they are at present, we have no doubt whatever.

It must not be forgotten that the arguments in this case are cumulative; some may be weaker, some stronger; but their force as a whole can hardly be resisted,—indeed is sufficient to sink any book not sustained by the prejudice engendered by long usage and undisturbed possession of the educational field. For it cannot be allowed, as some assert, that all the alleged defects can be easily remedied; some of them certainly are fundamental, and strike at the very root of the science. Nor can it be acknowledged, that the merits of the book are such as to countervail all its faults; until at least it can be shewn that no system of expounding the elements of Geometry, less defective, and equally or more meritorious, is possible. Until this be done, we are bound to believe that Euclid keeps its ground from force of custom,—in short from prejudice,—and nothing else.

This leads up to the consideration of the last branch of our subject, viz. the question of modern text-books of Geometry. The allegations against them are numerous, and made in such respectable quarters, that they deserve notice.

(1.) It is asserted, that none of the proposed substitutes for Euclid are quite satisfactory. This is very probable, as our geometrical teachers have been trained in Euclid, and have as yet had little or no experience in teaching any other book. We may observe, however, that to ignore all the new text-books which have been written is certainly not the way to secure a satisfactory one at last.

(2.) In confirmation of this assertion it is further said, that the modern text-books are *more* faulty than Euclid. We are not merely meeting assertion with assertion, when we express our conviction that they are *less* faulty. In reviewing Mr. Wilson's *Elementary Geometry*, the *Athenæum* reviewer shews every disposition to find out all the defects in the book he can. Let any one fairly compare these with the long list of faults in Euclid, so ably collected together by Professor De Morgan in the *Companion to the British Almanack* of 1849, of which we have in these pages made frequent use; or with the statement of the reviewer himself, that the *Elements* "swarm with faults; here an omission, there a redundance; here an obscurity, there an overlaboured clearness; here a logical superfluity, there an illogical shortcoming*"; and he will not, one would think, hesitate to conclude that the balance of adverse testimony is decidedly in favour of the modern, and against the ancient author. For ourselves, we have no hesitation in expressing our conviction, that though the modern text-books contain defects, yet that they are not as numerous as those of Euclid; that they are not as radical and inherent in their system and methods as his, and therefore are more remediable and more easily corrected; and, lastly, that from the study of them with their defects a wider knowledge of Geometry, and ultimately a better mental discipline, would be derived, than can possibly be acquired from the study of the older treatise.

(3.) In particular, an objection is raised against the system of modern treatises of Geometry, on the score of "its extent of preliminary assumption"†; and special exception is taken to the plan of introducing postulates wherever they are wanted, and thus leaving the student without any collective foundation for his geometrical reasoning; and it has been even suggested that this may be for the purpose of concealing trickery. Now it may be observed in reply to this, that such an objection comes with a bad grace from the advocates of Euclid, because this is just the license of which Euclid avails himself largely; and in his case the offence, if it be an offence, is worse, because he *does* make a profession of formally stating all his postulates at the commencement; and therefore any assumption afterwards introduced is made unawares. It has been well said, that "nothing should be tacitly assumed by those, who will not assume without express statement, that 'two straight lines cannot enclose a space.'"‡ And yet, as the same distinguished writer immediately afterwards shews, I. 1 and I. 22 demand two postulates to prove that the circles will intersect, viz. "if two figures which have one or more points in common have each a point which is not in the other, the boundaries of those figures must cut;" and, "every point is within or without a circle, according as its distance from the centre is more or less than the radius." I. 4 assumes the postulate, "any figure may be removed from place to place without alteration of form, and a plane figure may be turned round on the plane"; without which "right to turn, I. 4 would not prove I. 5." In I. 12 two postulates are assumed, viz., "if one point be taken on each side of an indefinitely extended straight line, any line which joins the two must cut the straight line"; and, "if one point of a straight line be inside a figure, the straight line must, if sufficiently produced, cut the figure in two points at least." In I. 35 and I. 43 use is made of the postulate, "an area taken from an area leaves the same area, from whatever part it may be taken,"—a postulate "particularly important as the key to equality of non-rectilinear areas, which could not be cut into coincidence geometrically."* Euclid in Book III. frequently appeals to our experimental knowledge of the form of a circle; thus taking for granted what has been never formally and definitely stated. If modern treatises on Geometry, then, contain a great deal of preliminary assumption, Euclid is shewn, and that too mainly on the evidence of one who on the whole is a strong advocate in his favour, to be by no means free from the charge.

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* *Athenæum*, July 18th, 1868, p. 71.

† *Ibid.*, Aug. 22nd, 1868.

‡ *Companion to British Almanack*, 1849, p. 6.

But it is quite open to argue that this practice is unobjectionable. There can, it may be justly urged, be no reason why all postulates and axioms, necessary for the matter in hand, should not be at once assumed, whenever they are needed; provided only that they be such as commend themselves to the common sense and experience of mankind, be judiciously chosen, and be *distinctly stated* before they are used. It may be further urged, that it is better to introduce them just when they are required, than to state them altogether at the beginning, and so burden the memory of the student, at his first introduction to the science, with a mass of matter of which he does not then understand the use.

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* *Ibid.*, p. 8.

The requirements of a good text-book would seem to be these: that all necessary particulars and axioms should be freely assumed, where needed, subject to the above-mentioned conditions; that the proof should in each case be given in the most simple and direct form, consistent with logical precision and perfection of reasoning, passing from what is more obvious to what is less so, or what, prior to proof, is not certain at all, the consequences flowing easily and naturally from the premises. Whether the reasoning need in every case be drawn out with verbal fulness is questionable; if the principles are fairly assumed, the data accurately laid down, and the conclusion rightly drawn and stated, the mind may often well be left to perceive the connection, without the necessity of adhering to any set formula of statement. It is in the fact, that modern authors have made a much nearer approximation to the fulfilment of these conditions than Euclid has, that their superiority lies.

(4.) Another objection to the use of modern text-books is, that their number and variety would create a difficulty. We do not find this in the case of Algebra, Trigonometry, and other mathematical or scientific subjects, in which the manuals must differ more, because the principles are not so fixed. Why should it exist, then, in the case of Geometry alone? As a matter of fact, too, no such difficulty is experienced on the Continent. I suppose the objection has reference principally to examinations. If so, it must be remembered,—a fact too much forgotten in the present day,—that students do not exist for the sake of examinations, but examinations for the sake of students. Further, it is more than probable, that the diversity of text-books would tend to improve the teaching of the subject: because each would present it in different aspects, with different degrees of elegance, and with variation in the development of doctrines; and because each would have its own special merits, and if it had also its own special defects, would yet be free from those peculiar to others. And so the teacher would acquire a wider and clearer view of the subject as a whole, and obtain a firmer and more accurate grasp of its principles and processes; and breadth and clearness of view, and certainty and tenacity of grasp, are essential elements in all good teaching.

From the use of modern text-books these two advantages would accrue:

(1.) The study of Geometry could be commenced at a much earlier age. Whatever, then, may be the mental habits, *e.g.*, accuracy of thought, closeness and precision of reasoning, &c., which the study of Geometry fosters, they would be sooner formed, and the result would be proportionately favourable to mental discipline.

(2.) A larger knowledge of Geometry would be acquired,—for the ground of Euclid, and much more, would be covered in far less space and time. There would be room for the study of Advanced Geometry, of which boys now for the most part learn nothing, but which is introduced in France into books, not exceeding Euclid in size, and which could be mastered probably in much less time. This advantage has been before referred to, but is so considerable as to deserve recapitulation in this place.

It may be asked, then, why continue to use a book which is faulty, when better ones for the purpose are to be had? The answer is, because we schoolmasters cannot help ourselves. As long as the Universities, the Civil Service Commission, the Military Education Board, the Committee of Council on Education, and other examining bodies retain Euclid, we have no alternative. Our pupils must be taught it, or else have their success imperilled, or rendered impossible, in examinations upon success in which all their future prospects,—not to say, what is of much less importance, the credit of their schools,—depend. But it has been suggested by some who appreciate the force of this point, and yet feel that something must be done,—use two text-books, Euclid and a modern one.* This may perhaps be better than adhering to Euclid alone; but then it would distract the attention, and perhaps confuse the notions, of young students; and even if it were otherwise desirable, time, which is already insufficient for the thorough mastery of the one book, would certainly not suffice for that of the two. This is one of those cases where the Universities, which ought to lead, rather retard the educational progress of the country, and suffer improvements too often to be forced upon them from without, instead of their being the results of spontaneous movements from within.

A few practical suggestions may be thought worthy of attention.

1. That schoolmasters, and all others interested in the matter, should combine to petition the Universities, and other leading examining bodies, to set Geometry, or certain branches thereof, as the subject of examination, and not Euclid, or so many books of it; leaving the students to get up their work either from Euclid, or some modern treatise, at the discretion of their respective teachers. This, I believe, Oxford and London already, to some extent at least, allow.

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* This doubtful experiment the author is now trying in one class of the school under his charge.

Cambridge, strange to say, still hesitates to follow the good example.

2. That a number of men, comprising eminent mathematicians and experienced schoolmasters, should combine together to compose an elementary treatise, fixing in concert the first principles of the science, and settling the general course to be taken, and then leaving it to one or more of their number to do the whole work, or assigning portions of it to different individuals—reviewing it when roughly completed, revising, amending, and perfecting. This would obviate the objection, which after all we have seen to be worth little, as to the want of uniformity in text-books, if Euclid were given up. That the committee of eminent men already appointed by the British Association, or that one to be appointed by some one of the Universities singly, or all of them conjointly, may undertake this work, is much to be desired.

3. That, until this be done, we should use one of the existing modern text-books, whichever we may respectively think best. These, though necessarily not yet perfect, possess considerable merit, and would certainly, if only a portion of the objections against Euclid be tenable, prove excellent substitutes for that time-honoured but antiquated treatise. Until we get something better, we should be glad to see one or more of these recognised publicly by some competent authority. Oxford, or Cambridge, may be induced perhaps to put its *imprimatur* upon one of them for a time.

4. That those engaged in mathematical teaching, who may be best qualified, should carefully note down their experience, and communicate what may seem to be valuable to those who have composed, or may be engaged in composing, geometrical text-books, with a view to assist them in the revision, or composition, respectively of their works, and so making them as complete, and as suitable for their purpose, as possible.

It must not be forgotten that the practical difficulty in the way of producing a good text-book must be at first considerable, from our want of experience in the use of any other book than Euclid. For though we may derive assistance in this way from France and Germany, yet we are necessarily hampered by our old traditions. And again, what is suitable to the education of one country is not always so adapted to that of another, where the national characteristics and requirements, the type of intellect, and the educational methods differ, as ours do from those of the continental nations.

This question is no longer to be trifled with. The convictions of those engaged in education are becoming too strong and decided to admit of prolonged delay. Some alteration in this matter must speedily take place; it may be made sooner or later, but be made it must. Those of us who are in earnest cannot allow generation after generation of our pupils to suffer, while people are making up their mind upon a question which can, and ought to, be decided at once. Not only those of us occupied in the actual work of education, but also those who are in any way interested in it, should combine their influence, and concentrate their efforts, for the purpose of substituting for Euclid a better text-book, written on modern principles. Though of course all the prejudices of our early education and of our past experience are in favour of Euclid, we are forced, however reluctantly, to the conviction, that it must be given up: and by an accumulated weight of argument we are obliged to believe, that there are but few, if any, educational reforms, which would be fraught with such beneficial results.

SEVENTH ORDINARY MEETING.

ROYAL INSTITUTION, 24th January, 1870.

JOHN BIRKBECK NEVINS, M.D., **PRESIDENT**, in the Chair.

The Rev. Dr. Jones was unanimously elected a Corresponding Member, on the recommendation of the Council.

The Rev. W. H. Dallinger was unanimously elected an Ordinary Member.

The President called the attention of the Members to Dr. Tyndall's lecture "On Dust and Disease," as reported in *The Times* newspaper of the previous Saturday. The subject gave rise to considerable discussion.

The following paper was then read:

ON THE FEUDAL POSSESSIONS OF ENGLAND ON THE CONTINENT.

BY JAMES BIRCHALL, ESQ.

THE subject of this Paper is one of the most prominent topics in all ordinary manuals of English History, and occupies no inconsiderable space in the annals of most reigns during the thirteenth and fourteenth centuries. Yet it may be safely asserted that few ordinary readers of English History, or even students thereof, have any clear notion of the bearings of this important subject, and of the influence which the Feudal Possessions of England on the Continent exercised upon the national destinies, and upon the formation of the national character. For, as a student of history, I readily concur with Professor Huxley's views, that national character and political aptitude are after all not to be attributed entirely to race, or to ethnological diversities, but to other and far different influences.

It is with a nation as with the individual; both are born with certain proclivities inherent in, and natural to them; but it is their future history, the circumstances to which they are afterwards subjected, which mould and develop these tendencies, and ultimately frame them into those qualities,—virtues and vices,—which we style national peculiarities. It is beside the object of this Paper to enter more at large into this question; but, having mentioned it, I was unwilling to pass it by without remark, because it forms the main argument in a lecture recently delivered by the Professor ("On the Forefathers and Forerunners of the English People"), and will become one of the great controversies of the day. I had also a further reason in this, that I think it will be within my power to show, in this Essay, that there is a strong overruling power at work in the history of a people, which in the course of events tends very considerably to alter and refashion their moral and political character, and that nearly always the entire future of a country depends upon how such and such an event turns; what present and immediate advantage a people takes of such and such a course of circumstances; and upon their ability to resent, or the necessity which compels them to submit to, such and such a course of treatment, at the hands of their rulers.

These observations will serve to foreshadow the method which I purpose to adopt with the subject in hand, which is to examine the relations which from time to time existed between the English monarchy and its French provinces, and to show how there sprung from these numerous opportunities, which our forefathers promptly and wisely used for the securing of their own present advantage, and the lasting benefit of their posterity.

By way of completing this introduction, I may be permitted to remark, that neither these nor any other provinces on the Continent were appended to England during the Saxon times. Our Saxon forefathers were, if I may so term them, the Japanese of their age; skilful like them in arts of delicate and curious workmanship; interfering with no other people's concerns, and jealous of the interference of others. Their character I fear will not bear too close an investigation, and has certainly not improved with the recent researches of ethnologists and antiquarians; but, if they sank into the slothful enjoyment of their possessions when once acquired, they plunged England into no foreign wars, and did not involve her in the intricacies of any Continental relations. The Normans, on the contrary, coming directly from the Continent, seized upon a new country without surrendering the. old. Their enterprise and ambition could not brook the limits of an island; and accordingly we date from the Norman Conquest the commencement, growth, and present development of our system of foreign diplomacy.

Like the first Hanoverian kings, the Norman sovereign of England was also a petty prince of the Continent, bound to a feudal superior. As in the later instance, so in the earlier, England was thrust into quarrels which in no degree affected her true interests, and practically reduced her into the mere appendage of a paltry Continental province. Since these disputes of the Norman kings were invariably prosecuted against their neighbours and superior lords, the Capets, it will be necessary for us, at the outset, to observe the political situation in France, about the time when one of her feudal chieftains became the Conquestor or Acquirer of the English crown.*

The empire founded by Charlemagne was gradually dismembered by the dissensions which continued among his descendants for the space of nearly a century after his death. It was during this turbulent interval that the Normans established themselves in Neustria; Brittany again became an independent state; the ancient kingdom of the Visigoths, situated between the Loire, the Rhone, and the Pyrenees, recovered its ancient sovereignty under the name of Aquitaine, or Guienne, and comprehended Poitou; while on the eastern side of the Rhone a new kingdom was formed, of Provence and the southern part of the ancient kingdom of the Burgundians. Within the space surrounded by these new states, that namely between the Loire, the Meuse, the Scheldt and the Breton frontier, was compressed the kingdom of the Franks, having for its eastern neighbours the counties of Flanders and Champagne, whose earls, as well as the dukes and princes of the before-mentioned states, acknowledged

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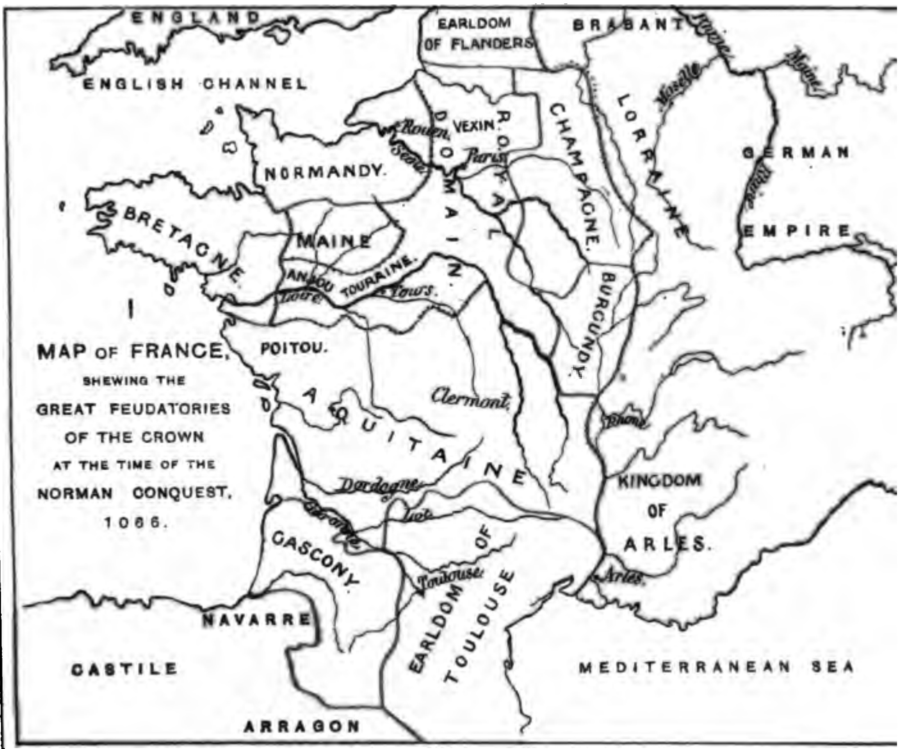
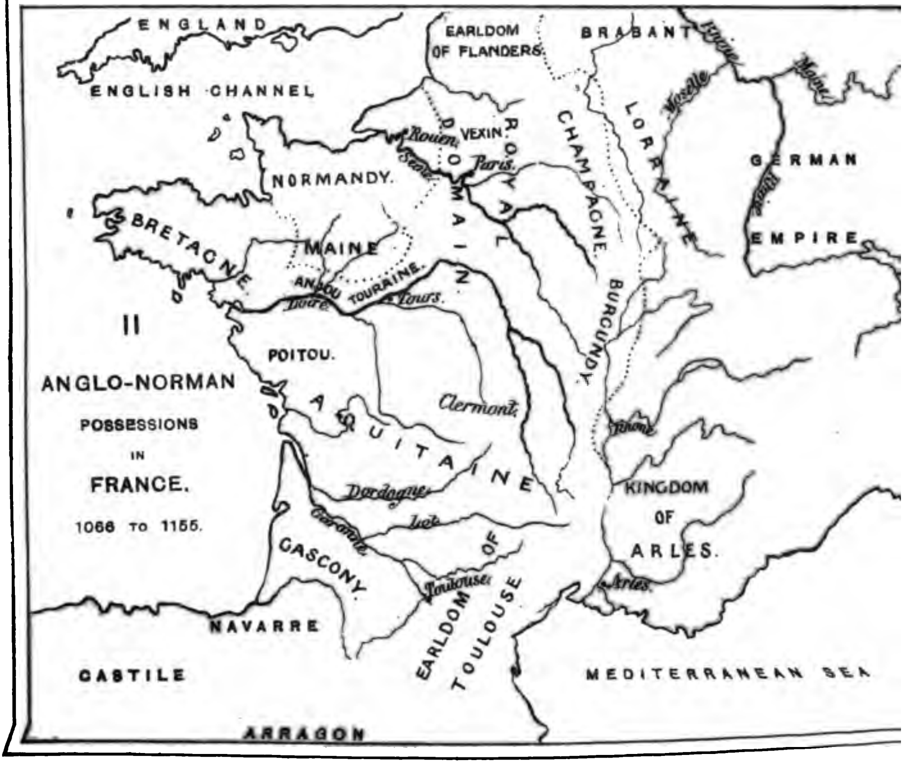
* *Vide* Map I



I

MAP OF FRANCE, SHEWING THE GREAT FEUDATORIES OF THE CROWN AT THE TIME OF THE NORMAN CONQUEST, 1066.



II

ANGLO-NORMAN POSSESSIONS IN FRANCE. 1066 TO 1155.

the feudal sovereignty of Hugh Capet and his successors. Geographical France, therefore, was at this period a mere union of independent principalities, whose sole bond was the nominal one of feudal allegiance. This state of things will mainly account to us for the singular indifference with which Philip I., the king of France, beheld the aggrandisement of his feudatory, the Duke of Normandy. Consisting as Europe then did of a number of unstable and constantly varying powers, which were engaged in incessant petty wars with each other, and were not bound together by any common interest, it was impossible that any system of statesmanship could be developed for their mutual benefit.

The ruling families intermarried, but their alliances were productive of no political union; great victories were for the most part barren of results, and at the best produced little more than the transient superiority of the conqueror, or the temporary extension of his frontiers. But when the conquest of a new realm, in so bold and commanding a position as that of England, began to display its full effects, by conferring upon its rulers a preponderating influence in the west of Europe, the kings of France awoke from their lethargy, and there ensued a systematic rivalry between the two monarchies which was maintained almost without intermission for the space of three hundred and fifty years. The history of this long continued contest is the history of the feudal possessions of England on the Continent—the kings of France, on the one hand, struggling to dispossess their overgrown vassal of his continental provinces; and the English sovereigns, on the other hand, persistent in their attempts to consolidate them and enlarge their borders.

The contest, at first, was only for the retention of a mere province; but the wars widened, through various fluctuations, to such an extent, that all Europe became involved in them, the prize being nothing less than the crown of France itself.

At one time, by a strange concurrence of circumstances, two-thirds of the entire French territory acknowledged the sway of the English sovereign, and, as Macaulay has expressed it, there appeared every prospect of the establishment of another Western Empire, which would extend from the Mediterranean to the Northern Seas and the ancient Ultima Thule.* But the conjuncture of a statesman sitting on the throne of France and a fool on that of England, suddenly dispelled this vision, and the coming empire collapsed into a petty province at the foot of the Pyrenees.

At another period, after long years of straitened frontiers, these Continental possessions once more expanded, and for the last time. An English sovereign became more than the mere claimant or pretender to the French crown; by one of the most signal victories recorded in the scroll of English fame, he wrested the sovereign power from the hands of its imbecile possessor, and wielded authority as regent; his son was actually crowned, with all the ancient pomp and ceremony of the Capets, in their own cathedral shrine, and in the presence of their most potent feudatories. But, as in the former case, all this manifestation of conquest and possession was but an idle and vain-glorious pageant, and English dominion in France fell, never to rise again, before the mysterious influence of the Maid of Orleans.

Without, however, indulging further in these general views of the changes which affected English territory on the Continent, let us dwell for a brief while upon each of the important eras when these changes were most sensibly developed. These eras are five in number, and are represented by the maps which illustrate this Paper. In the second of these maps, we have exhibited the extent of the Duke of Normandy's dominions, when he added to them the crown and realm of England. Besides his own duchy, he held also in dependence the earldoms of Anjou and Maine. But the Norman kings of England soon found that the possession of these dominions on both sides the Channel was a source of constant danger, from the very ambiguity of their position. Powerful and independent sovereigns in the island, they were the jealously watched vassals of a feudal lord on the continent. Their most formidable subjects were the possessors of fiefs and castles in both countries, so that the leaders of revolt in England were always able to escape, in the event of failure, to their fortresses in Normandy, whence they defied their sovereign from beneath the protecting shields of the kings of France. In addition to these evils of their position, the Norman kings had to contend against another, of far greater peril—dissensions in their own families. William the Conqueror nearly lost his life in the quarrel with his son Robert concerning the duchy of Normandy; the same Robert had a bitter warfare to maintain with his two brothers for the security of the same inheritance; and he ended a turbulent and ill-spent life in a dungeon, after a long captivity, solely because he was the envied possessor of the duchy which his brother coveted. It is a melancholy history, this of the early Norman kings, and of their parricidal and fratricidal wars; but the troubles which befel the first Plantagenet, on account of his foreign possessions, present a record far more humiliating. The accession of this sovereign (Henry II.) at one bound extended English dominion in France from the river Somme to the Pyrenæan frontiers of Navarre and Arragon. This sudden and wholesale aggrandisement of wealth and influence to the English crown was owing to the following circumstances. Louis VII. of France, more honourable than politic, set aside his wife, after a union of sixteen years, on the ground of her infidelity. The rejected lady was the duchess of Aquitaine; the heiress of dominions which comprehended a fourth of France. With such immense attractions, so dazzling in fact as to conceal in their glare the dark stains upon her character, this divorced queen was pursued by all the needy princes in the neighbourhood. According to the fashion of that age, the majority of these suitors endeavoured to seize her hand by force; but with her veteran experience of married life, combined with those accomplishments in the arts of intrigue which she had acquired in the Eastern Crusades, Eleanor was not a princess to become an easy prey, and she only fell at length into her captor's hands, because that captor was a degree more cunning and resolute than herself.

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* *Vide* Map III.

Thus it was that Henry, Earl of Anjou, afterwards the Second of England, brought to the English crown the cities and vineyards of the lovely land of the Troubadours. Such a marriage, however, being the consummation only of policy and ambition, could not prosper, and it bore the bitterest fruits. History records the existence of few families within whose bosoms there raged more mutual hatred than in the household of this unfortunate Plantagenet. And these Aquitanian dowries of his wife were at the bottom of all the wickedness. To disarm the jealousy of the French king, Henry made a show of ceding to his eldest son the earldoms of Maine and Anjou; Richard, of the Lion Heart, the second son, was created Earl of Poitiers; and Geoffrey, the third son was betrothed to the heiress of Brittany, and in her right ruled that ancient duchy. As we shall see more at large presently, the populations of these various provinces were of hostile races, whose sympathies co-operated with the rebellious tempers of Henry's sons, fomented by the malice of a jealous wife, "an Até stirring them to blood and strife;" and all of these persistently disturbed by the king of France, a series of dark scenes of discord followed, whose counterpart can only be found in the most dismal times of the Carlovingian kings, or during the eras of the Western Emperors. Queen

Eleanor, the chief instigator of the troubles, was early arrested and imprisoned, as she was travelling to the French court in male disguise. But a more dangerous enemy remained at large, in the person of Bertrand de Born, the Troubadour, whose animosity and malice, as shown in these unhappy feuds, have secured for him an infamous remembrance in Dante's *Inferno*. He was constantly engaged, as the poet represents him, in counselling the children against the father, and then each against the other; never allowing them an instant's peace, but daily exciting them by his sirventes, or satirical songs. First he united all the races south of the Loire against the old king, and in favour of the three sons; then he endeavoured to expel Richard from his earldom, with the aid of his elder and younger brother. On this the father interfered, to befriend his overmatched son; on which a war succeeded, wherein the father and the second son contended against the eldest and the youngest sons. Historians who were eye-witnesses of these dreadful broils attributed them to all sorts of strange and unheard-of causes; and one of the sons even alleged that one of his maternal ancestors had been a witch, and exclaimed to his friends, "Is it to be wondered at, that, coming from such a source, we live ill one with the other? What comes from the devil must return to the devil." "It is the destiny of our family," said another of the sons, "not to love each other. That is our heritage, and none of us will ever renounce it." And to prove the reality of this fiendish resolution, he solicited his father to an interview of peace, and secretly ordered his bowmen to shoot at him during the conference. Judgments could not long remain suspended over such deliberate misdoings. The eldest son was seized with a sudden and fatal illness; the third son was trampled to death in a tournament; and the old king, driven to bay by his two surviving children, died of a broken heart, cursing the day of his birth and the children he left behind him. All these calamities were, as I have stated, the offspring of that ill-starred marriage which placed Southern Gaul under the dominion of Henry II. Glorying in the possession of so much power, Henry Plantagenet had placed his sons, in the character of satraps, to rule over nations who differed widely in race and manners and national sympathies. He sought to unite politically those whom nature had divided.

The immense extent of French dominion, over which Henry was thus the unhappy sovereign, was divided by the river Loire into two distinct parts. South of that river dwelt the people of the *Langue d'Oc*, inhabiting the most flourishing and civilised portion of Western Europe in the twelfth century. It was here that the feudal system, which held the rest of France in bondage, was unknown. The soil belonged to the body of the people; the duchies, countships, and lordships were all more or less national; no foreigner, as in both England and France, had usurped any power or dignity, and the municipalities and governments were in the enjoyment of their ancient privileges, as if they were Roman municipaliæ still. They were as free as their contemporary Free Cities in Northern Italy. Thus Southern Gaul, or Aquitaine, was, at the accession of the first Plantagenet to the English throne, the most ancient home of freedom in Europe; its literature, derived from the Romans and the Greeks, and enriched with an intimate communication with the Moors of Spain and Africa, was then the most polished, as its language, that of the Troubadours, was the most harmonious, in Europe; its laws, coming from the same source, formed a complete code: while its ports, originally founded by Greek colonies from Italy, had maintained the chief commerce of the Western Mediterranean for ages past. The land was thus filled with rich and populous cities, and its people, dwelling in plenty, were infused by their literature with that spirit of chivalry and adventure which finally set all Europe in a blaze during the age of the Crusades. Freedom of action and of political thought naturally engendered in this high-souled people freedom of religious enquiry; and the earliest *protéstants* against the errors and usurpations of Rome were found among the Albigenses, who lived in the mountainous districts of Auvergne and Toulouse.

The other portion of Henry's dominions lay on the north side of the Loire. Here the people were quite distinct from those of the South, in language, laws, and habits. Whereas Aquitaine was the country of the *langue d' oc*, where *oc* meant yes; here the *langue d' oui* or *d' œil* prevailed, where *oui* or *œil* meant yes. Feudalism and serfdom were firmly established here; there were no popular institutions and no municipal rights. The Aquitanians were the descendants of the Roman Gauls, and included that remarkable people the Basques, who represented the most primitive inhabitants of the country. But these northern populations were of various extraction; they were Franks in the Isle of France, and Normans in Neustria, races who had dispossessed the Gauls, while in Brittany they were Celts, free amidst their mountains from the intrusions of the Teuton nations.

In neither of these two geographical divisions was the rule of the Anglo-Normans popular. A most remarkable instance of this is shown in the history of Arthur of Brittany. This prince, whose misfortunes have been immortalised by our national poet, was the posthumous son of Geoffrey, the third son of Henry Plantagenet. His mother was Constance, the heiress of Brittany. His Norman grandfather desired to give him a Norman name, but the Bretons insisted on his receiving the Celtic name of Arthur. The war which broke out between this prince and his uncle, concerning the title to the English crown, was marked by many circumstances which still further illustrate this fact. No sooner had Arthur openly asserted his claim, than the people of Anjou, Maine, and Touraine, through hatred of the Norman king of England, allied themselves with Arthur; the people of Poitou presently joined them; and these confederates, being strengthened by the arms and policy of Philip Augustus, the reigning French monarch, the Norman crown of England was in a few years bereft of all its Continental provinces, save the duchy of Aquitaine.*

The results of this second war, between the Capets and their Plantagenet vassals, were of lasting importance to the two countries. The overthrow of Norman power on the continent enabled the French monarchs to avail themselves, without any dread of interference from England, of the crusade against the Albigenses. They thus acquired the sovereignty of Toulouse and Provence, the wealthiest and most civilised provinces in Southern Gaul; and the dominions bequeathed by Hugh Capet, formerly hemmed in by so many powerful feudatories, were now, after the lapse of three centuries, extended to the shores of the three seas. By a singular destiny, Aquitaine, which had been retained under Anglo-Norman dominion solely by the influence of the duchess Eleanor, and which had always borne the Norman yoke with impatience, continued faithful to the English crown, through hatred of the French, and the preference of its people for a master whose distance from them prevented his frequent interference in their concerns. This connection brought about some very important consequences in the progress of England. An active commerce sprang up between our Channel ports and the Basque provinces, and the opinions of the Albigenses, thus imported, had no small influence in contributing to the successful dissemination of Wycliffe's reformed doctrines.

Normandy, on the other hand, the mother country of the

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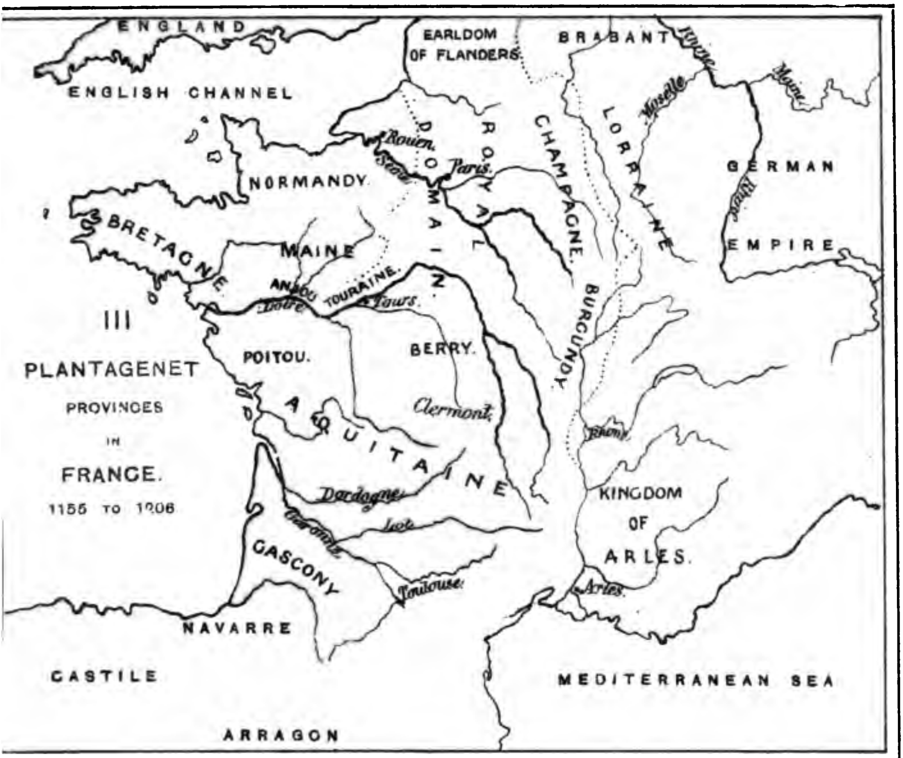
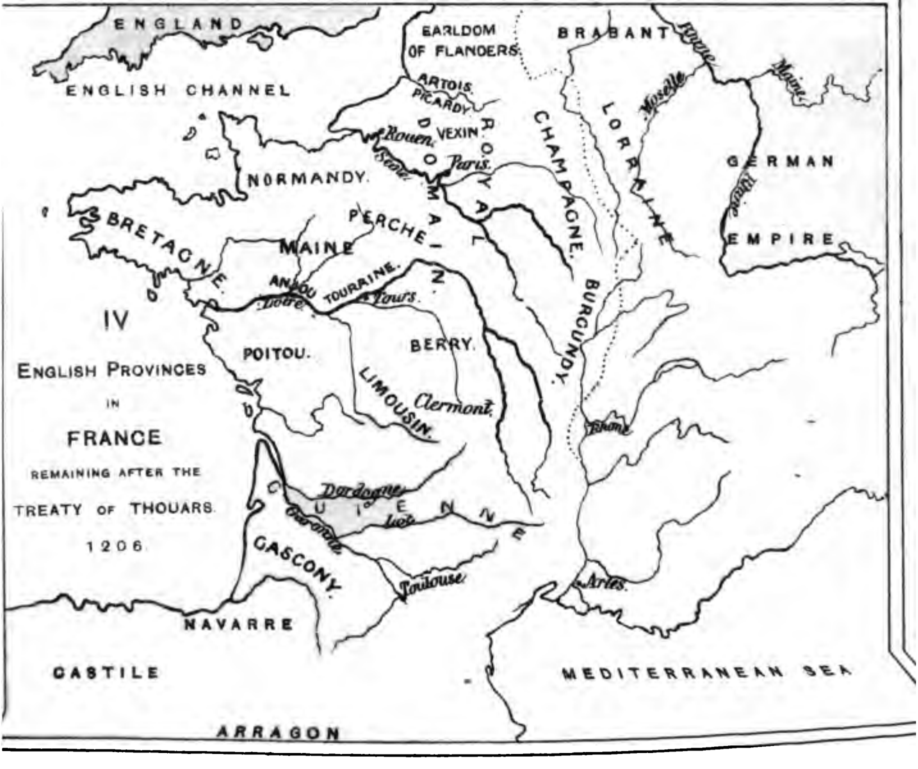
* Compare Maps III. and IV.


III

PLANTAGENET PROVINCES IN FRANCE.

1155 TO 1206


IV

ENGLISH PROVINCES IN FRANCE REMAINING AFTER THE TREATY OF THOUARS.

1206

kings and nobles of England, became entirely estranged from them. Similar in language and manners to their French neighbours, and having no communications with England, except with the Channel fisherman, who could not speak their tongue, the Normans soon learned to espouse with ardour the enmity of the French kings against England; and when Edward III. made his celebrated march through the duchy, he found that there was nothing in common between him and the inheritance of his ancestors.

More interesting to us, however, than all these, were the effects which this disruption of Norman-French dominions had upon the social and political progress of England. The authority of the crown, which under the Norman kings had become so absolute as to be dangerous to the liberties of the country, was so materially reduced by the loss of such considerable possessions, that henceforth no king could venture upon a foreign war without obtaining the requisite supplies from his parliament. In no single instance were these supplies granted, on any large scale, without an equivalent being wrung from the sovereign, in the surrender of some of those prerogatives which the Norman kings had from time to time appropriated to themselves, when the expression of their will was the only recognised law. All classes, after this, combined in their resistance to this sovereign power of the crown. In the Norman times, resistance to oppression had never assumed any other form than that of rebellion, and the despised English were persecuted equally by the king and the barons, their Norman oppressors. But now, the barons had no homes or estates, except those which remained to them in England; and instead of resenting the title of Englishman as an insult, they learned to regard it as an honour. This change of feeling drew them into closer relationship with the English, towards whom they had been gradually drifting for many years. Saxons and Normans at length boasted in the same nationality; and, their interests being concentrated under one monarchy, they united their efforts for the protection of the rights and the promotion of the welfare of all. The retention of Aquitaine contributed still further to secure these results. Owing to the defections among their own barons, both John and Henry III., his son, imported from thence numerous mercenaries, whose term of service was not bound by the restraints of the feudal laws, and who, being aliens, amidst a hostile people, were thereby compelled to keep faith with their only protector. These foreign legions were so freely enriched with lands and revenues, plundered from the rebellious barons, that there were imminent prospects at one time of a Gascon settlement in England. This exasperated the barons, who thereupon combined more closely with the middle classes for the expulsion of these foreigners from the realm. Magna Charta was the immediate fruit of these proceedings, in the reign of the first king; to them we owe the foundation of the House of Commons, in the reign of the second king; while the obstinate partiality of their successor Edward II. for his Gascon favourites led to the first enactment of that law which still holds good in England, that no foreigner shall hold any office of emolument or trust in these realms.

Such, then, were the vicissitudes by which the English possessions on the continent were reduced to a province, the inhabitants of which lived on the farthest borders of France, and had no feelings in common with their feudal lords. Henceforth the history of these possessions assumes a new aspect. The contests which they had hitherto entailed upon the sovereigns of the two countries had never become national in England; English barons, because of their French relationships, were often found in the ranks of their sovereign's foes; and the native English, in the earlier times, had joined in the wars for the sole purpose of revenging themselves upon the countrymen of their oppressors. The wars between the French monarchs and the Norman and early Plantagenet kings were of a purely personal character, forced on by the fixed determination of the superior lord to cripple the power of a formidable and overgrown vassal; while, on the contrary, the wars which Edward III. and Henry V. waged for the recovery of their lost inheritances were entirely national, and were entered into by their subjects with an avidity which only the strongest passions can beget. The age was that of chivalry, when the thirst for military renown was the predominant feeling in every heart. All the youth of England were on fire; honour's thought reigned solely in the breast of every man; and needy knights sold their pastures that they might follow with horse and retinue the banners of their sovereign, the mirror of all Christian kings.* The prize which thus set the whole national mind in a ferment was, however, not the acquisition of a few provinces, but the conquest of a rich and powerful kingdom. Both Edward III. and Henry V. claimed the French crown, as of rightful inheritance; and the English, unable to perceive the mischief which would recoil upon themselves in the event of success, aided their monarchs to the utmost.

It is beyond my purpose here to narrate the well-known details of the wars of these two famous sovereigns, and their three great victories of Crecy, Poictiers, and Agincourt, which intoxicated the people, and impressed them with a belief in their own invincibility. But all this unexampled success ended in a complete change of fortune, chiefly in consequence of the intrinsic difficulty of preserving the acquisitions which had been made. Before the war, Edward possessed the duchy of Guienne, or Aquitaine, left by his forefathers; and he now added to it no more territory than the city of Calais and the surrounding districts, including the County of Ponthieu.* The throne of the Capets was still as far beyond his reach as the rainbow in the clouds; the reward of his brilliant victories was quite as unsubstantial, while they were succeeded by a series of misfortunes which closed the reign in dishonour, and left Calais the only real possession to be transmitted to his successor. The inhabitants of Guienne remained passive spectators throughout the war, for, with their traditional policy, they dreaded the approach of their absentee lord, should he conquer France, while the success of the French king was a source of equal danger to their independence. Of such little importance, however, had this province now become, that when Henry V. invaded France, its possession by either party was not considered worth an effort. At one time, in these second wars, there certainly appeared every prospect of the complete establishment of English dominion over France. France was wracked by dissensions in the royal family; by the turbulence of those princes who remained faithful to the crown; and, more than all, by the treason of the Duke of Burgundy, the most powerful of its feudatories. The youthful head of the House of Lancaster had wrung from the French parliament an acknowledgment of his title as regent and heir to the throne; he had been betrothed to the king's daughter, and the solemn conclusion of the treaty of Troyes promised the fullest security to the duration of his power. Never was the truth, that in the midst of life we are in death, more forcibly illustrated. Marriage festivities, peace demonstrations, anxious passing to and fro from realm to realm, family troubles and family rejoicings, the birth of an heir to three kingdoms, with its attendant shows and pageants befitting the advent of so great a prince;—all these circumstances marked the two eventful

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* Henry V. Act i. Scene 2.

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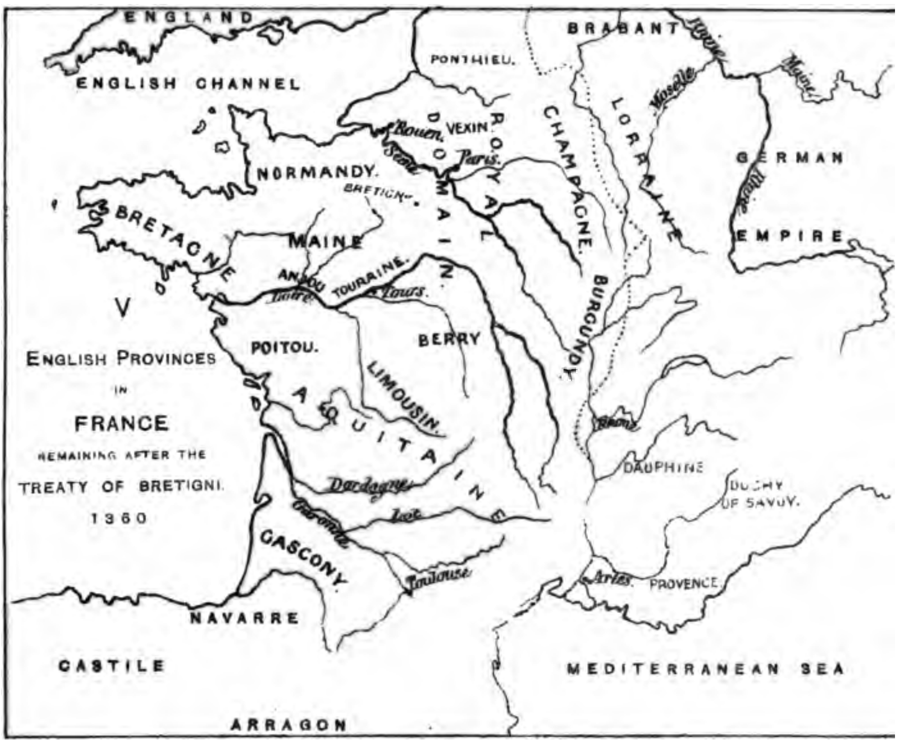
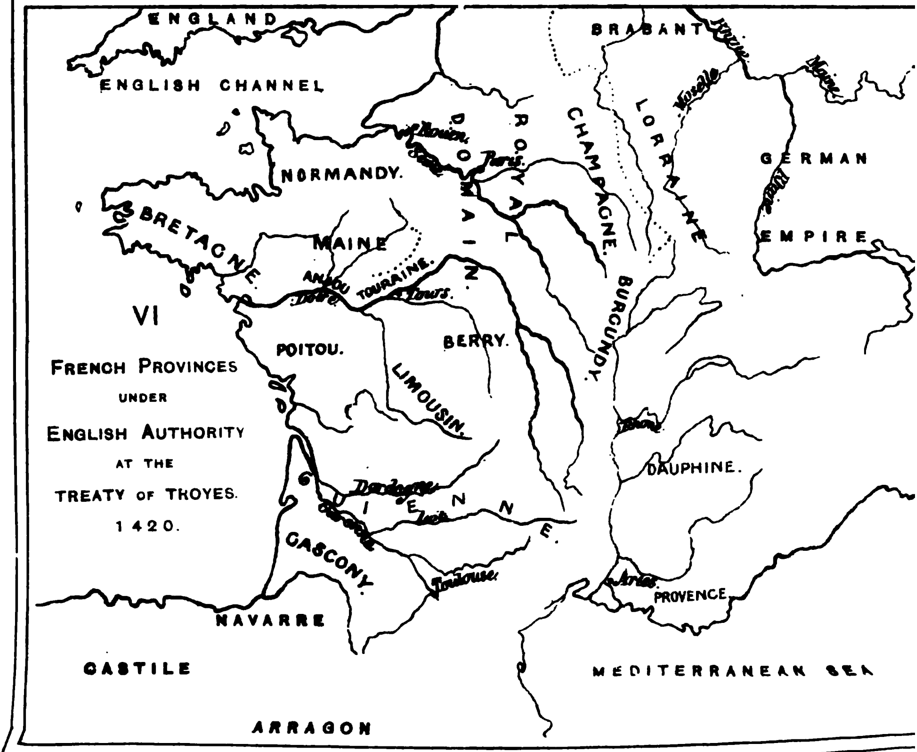
* *Vide* Map V.



V

English Provinces in France remaining after the Treaty of Bretigni 1360



VI

French Provinces under English Authority at the Treaty of Troyes. 1420.

years which followed the glorious treaty. Yet, underneath all, secretly, silently, but nevertheless surely, was there an agent at work, which, at one blow, crumbled victor, victories, and all their accompanying trophies in the dust. The first and last English conqueror of the throne of France fell under the ravages of a mysterious disease, leaving an infant son, not yet a year old, to wield the sceptre of a dominion which embraced three distracted kingdoms. Need I lengthen the story further, and tell of the constant activity and persistent success of the rival French king, the wonderful deliverance of her country by Joan of Arc, and the last defeat of English soldiers in their ancient continental possessions, when the brave old earl Talbot was slain and overthrown in the battle of Chatillon, in Guienne. Nothing now remained but Calais, which, though retained by England for a century longer, never rose to importance, but stood as the solitary emblem and relic of all that Henry II. and Eleanor had inherited, and Edward III. and Henry V. had conquered. Yet not all; there remained the Channel Islands, and that other memento of disappointed ambition—the barren and absurd title which all our sovereigns, even to the Georges, retained with such strange obstinacy, and which is still printed at the head of the Dedication in our authorised translation of the Scriptures, "James, by the grace of God, King of Great Britain, *France*, and Ireland."

Thus closed, happily for England, the second attempt of the Plantagenets to re-establish themselves on the soil of France. Had they been successful in their enterprise, this realm would have become a mere appendage to the crown of France, and a power would have been placed in the hands of our monarchs altogether irreconcilable to liberty. Free parliaments and equal taxation under popular restraint had been suppressed in France for many years, and, backed by the immense armies of mercenaries and the resources of their continental dominions, the Plantagenets would speedily have reduced England to the same subjection. This impending evil was very early foreseen by our ancestors, who chafed at every prolonged absence of the sovereign, and whose jealousy of the crown's aggrandisement kept them ever on the watch, to guard their country against the probable loss of its independence. In 1421, the parliament petitioned the Duke of Gloucester, whom Henry V. had left guardian of England, that he would move the king and queen to return as speedily as might please them, in relief and comfort of the Commons; they further requested that their petitions might not be sent to the king beyond sea, but altogether determined "within this realm of England during this parliament;" and they desired that this ordinance might be of force in all future parliaments to be held in England. Although the guardian declined to accede to these petitions, the Commons were not thereby daunted, and they succeeded in renewing the statute which had been passed in the reign of Edward III., under the excitement of similar fears, and which declared that England was a free and independent realm, subject to no foreign control. While the parliament thus preserved their country in its integrity as a free state by their persistent assertions of its independence, their efforts were rewarded by one of the oldest and most important of our parliamentary privileges—that of their right to control all matters of peace and war, and direct the foreign relations of the realm. The constant hostilities into which the Continental provinces plunged the crown, impoverished the revenues derived from the royal domains, and compelled the sovereign to fall back upon his parliament for supplies; the loss of so many provinces at one blow, in the reign of king John, rendered these imperial necessities still more urgent, and we do not find any of the Plantagenet kings, after this, entering upon any war, or concluding any treaty of peace, without first taking the advice and obtaining the concurrence of the estates of the realm.

Let us reflect here for a moment how narrowly our country escaped so great a degradation, at this crisis, as that of becoming the mere province of a second Empire of the West. Where would the liberties of England have been now, if the schemes of Edward III. and Henry V. had been accomplished, and they had founded a new imperial dynasty on the ancient throne of Charlemagne? Who shall say that England might not have been at this day in the position of Italy, for example, passing through the first ordeals of a newly-founded Constitutional government; or of France, still aspiring for liberty, but powerless to resist the strong hand which withholds it, and ripe for revolution as soon as that hand relaxes its grasp? These countries are only politically different from ours in this respect — that they are passing through those struggles for constitutional freedom, which we in England now survey across the landscape of centuries. For, virtues of blood and race notwithstanding, and all alleged peculiar aptitudes for political institutions, the progress of our national liberties, during the wars engendered by our continental possessions, was in constant danger, because the national mind was being regularly diverted to schemes of conquest, and the ever-increasing thirst for military renown, which they created. So thoroughly, in fact, had the warlike passion taken possession of the English nobles, that, when they were finally expelled from France, and the ancient fields of their glory had become the tombs of their fame, they were forced by habit and necessity to turn their arms one against the other, until, on the plains of Towton and Bosworth Field, and many as bloody a scene, their lust for the sword and the battle was extinguished only with their lives. But, as with our political institutions, so was it with the national mind; the passions which threatened to convert the English into a nation of warriors were overruled for good, and, under the influence of our free constitution, were developed into those lofty faculties which have shed such a lustre around the victories of Edward and Henry.

> There is *some* soul of goodness in things evil,
> Would men observingly distil it out.

Where is the English heart that does not even now throb with pride, when the story of Cressy is recounted, of

> . . . . . "Edward, the Black Prince,
> Who, on the French ground, played a tragedy,
> Making defeat on the full power of France,
> Whiles his most mighty father, on a hill,
> Stood smiling to behold his lion's whelp
> Forage in blood of French nobility.
> O, noble English, that could entertain
> With half their forces the full pride of France,
> And let another half stand laughing by,
> All out of work, and cold for action!"*

Or, when the eve of the battle of Agincourt rises in his memory, and he sees those twelve thousand "poor condemned English, like sacrifices, by their watchful fires sit patiently, and inly ruminate the morning's danger," when they have resolved to encounter eight times their number of the chivalry of France, and to conquer or die?

All this unconquerable resolution, this tenacity of purpose, this thirst for deeds of high daring and noble enterprise, was, however, engaged in the cause of folly and wickedness; for it is certain that no wars were ever more unjustifiable than those which Edward III. and Henry V. waged against France. Had these great qualities been devoted to the good of mankind, to the extension of commerce by the discovery of new lands, or to the advancement of social and material welfare at home, we can hardly exaggerate the benefits which would have accrued to the country, nor place a limit upon the evils which, suffering in consequence, she might have escaped. National sins most surely beget national troubles; and the genius of every nation, which is not developed in its legitimate channel, will become a curse and not a blessing. "All they that take the sword shall perish with the sword."

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* Henry V. Act i. Scene 2.

It was well for England that those who controlled her destinies, after the loss of all her conquests, so very early perceived the folly of which her sovereigns had been guilty. Henry VIII. would again have inspired her with prospects of French conquest, and for a short time thought to gratify the waning passion by the capture of Boulogne. Nay, even the politic Elizabeth was elated with pride at her temporary occupation of Havre, after the loss of Calais; and the sagacious Cromwell, considered it a glorious achievement to have planted the foot of England once more upon the Continent, by the surrender of Dunkirk to English rule. But a council of English statesmen, in the reign of the second Henry Tudor, wiser in their collective capacity than all these, distinctly foresaw the true path of honour and profit for English daring and enterprise. This council, among whom was Lord Herbert, who relates the fact, passed a remarkable resolution, expressing their opinion that the sea, and not the Continent, was the true sphere of English exploits; and that Providence, having given our island an extensive seaboard, innumerable ports, a commanding maritime situation, and a high spirited people panting for achievements, the discovery of unknown lands, the establishment of colonies, and the expansion of commerce were projects which would bring wealth to her shores, and profit and honour to her citizens; and that it was the monarch's duty to encourage these as much as lay in his power. This sage advice was given at a time so opportune, that its worth was increased a thousand fold. Maritime discoveries had been made of such grand extent, that Europe, in a delirium of wonder, asserted the existence of a New World far outstripping the Old in riches and magnitude; and Englishmen, as eager now for the front as at Poictiers and Agincourt, bent sail and oar in the race across the Atlantic. Visions of conquest in France, now long dispelled, were thus replaced with dreams of lands teeming with gold and diamonds. Protestant England burned to deliver the benighted Indians from the grasp of the Papist Spaniards; her merchants sent out from every port enterprising voyagers for India and the coast of Guinea; adventurous navigators sought out year after year new routes to the golden regions through the Arctic Seas; and even noble peers, whose ancestors sold their lands to equip their retainers for a French campaign, now disposed of their acres in like manner, to man a fleet wherewith to capture the Plate ships from the Spanish Main. During the French wars, trading and shopkeeping, despised by the nobles, and contemned by their followers, were left exclusively in the hands of foreigners, whose companies and guilds increased so rapidly, that they threatened to make a commercial conquest of the country. Native merchants and workmen, unprotected by laws or customs, were unable to resist the constantly extending tyranny of these powerful companies, whose privileges were secured by ancient charters, and who basked in the sunshine of royal favour. But no sooner were the French wars terminated, and the nation, by a long breathing time of peace, enabled to see into the true bearing of its own concerns, than the German merchants of the Staple and the Steelyard, and the numerous brotherhoods of Lombards and Italians, were gradually deprived of their monopolies; their markets were thrown open to the people at large, and the nation rushed into commerce, and planted factories beyond sea, with all the daring and intrepidity and pertinacity of purpose which distinguished the foemen of Cressy and Agincourt.

The possession of a paltry province, or petty town with miserable streets, must have been grandly scorned by men who navigated the globe for the discovery of ancient but long obscured empires, or penetrated an illimitable continent for the capture of cities whose houses were reputed to be gold and their pavements silver.

Such were the magnificent ideas and actions, in which all the ancient energy of the English character, as displayed in wars for French conquest, was completely absorbed. The ancient hatred of France died away; and though it revived after a long entombment, its resurrection was brief, and was totally unconnected with the lust of French dominion. Once again, in our own day, it has descended to the grave; for ever, let it be hoped. For we in our day, as our ancestors in the days of Henry Tudor, have bitterly learned the lesson, that there is neither honour nor profit in Continental dominion, or in our former constant interference with Continental politics. The sea is our natural element; that is the proper place for English energy to shine in. Such was the counsel of our statesmen three hundred years ago; and reflection and dearly-bought experience have taught us that it is both true and wise.

EIGHTH ORDINARY MEETING.

Royal Institution, 7th February, 1870.

JOHN BIRKBECK NEVINS, M.D., President, in the Chair.

The Rev. H. H. Higgins exhibited some fine specimens of fungus (*Peziza coccinea*), which he had found at Rainhill.

Mr. Mott called attention to the reported death of Dr. Livingstone, and strongly deprecated the transmission of such reports from English agents abroad, in which neither names, dates, places, or trustworthy authorities were mentioned. He considered that accounts of such men as Dr. Livingstone, in whom the whole nation took the deepest interest, ought not to be sent off-hand to this country by our officers located on foreign stations, and then went on to explain his reasons for not crediting the story which had been circulated.

Mr. A. Higginson next read a letter from Mr. Clarke, of Saffron Walden, in which the following new fact concerning the nightingale was mentioned:—"It is an inveterate bee-eater; with its beak it will tap the entrance of the hive, something after the manner of a woodpecker tapping the bark of a tree. This causes the insects to rush to the entrance, when they are seized with the avidity of lightning, snapped in the middle, and the head half swallowed, until quite a heap of bodies mark the devastation it has created. A neighbouring bee-keeper set a spring trap, and caught one. He left it alive; a vast cluster of bees, instinctively knowing it to be their enemy, surrounded it, and, as it soon died, it was taken for granted that it was stung to death." The communication of this fact led to considerable discussion.

The following paper was then read:

THE CHEMISTRY OF THE PLANT AND THE ANIMAL.

By EDWARD DAVIES, F.C.S.

At the present time, few scientific questions are exciting more investigation and speculation than the phenomena of that mysterious property of organisation which we call life. Whether we consider it in connection with the humblest forms of vegetable or animal life, or with man himself, embracing its relations to consciousness and thought, no subject can be more engrossing to an enquiring mind, nor more worthy of our highest powers. Long considered as something *sui generis*, to be taken for granted without seeking to know how or why it was, it is now submitted to the keenest discussion, and a feeling seems to be abroad that it is something not so wonderful after all. Ages of daring speculation have been before, but the distinguishing features of this era are that scientific explanations alone are admitted, and that the unknown is confidently pronounced to be only another form or combination of the known. The study of the forces of nature has yielded results of such magnitude, that we may be excused if we put no limits to its future triumphs. But are we sure that we know all these forces? certainly we do not know why they are, why under some circumstances we have the development of one, and under others of another. At least we may be sure that in the study of the known forces we are on safe ground, and that modest research rather than bold theorising is the sure way to wrest nature's secrets from her grasp.

At one time electricity was the favourite explanation of life, as of almost all phenomena which could be referred to nothing else. But this is now sunk, to be only useful in telegraphy, and to be called in by the unlearned to explain table-turning; chemistry seems to have taken its place; and, lo! life is a chemical equation.

Some slight help to our thoughts on this subject will be to have clear ideas as to what we know of the chemical reactions which take place in animal and vegetable organisation. Not that organic chemistry can be compressed into one paper; but the broad principles of chemical action may be unfolded, and the different manifestations of that action in these two great departments of life, contrasted. The chemical reactions which take place in those humble organisms, whose place has so long been unsettled, are now generally admitted to be the surest guides to a true location of them as plants or animals. Spontaneous motion having been given up, no other distinction than the chemical one is at present possible, if there be indeed a distinction, as I believe there is.

The nutrition of vegetables is derived wholly from the inorganic world. Carbon di-oxide, water, ammonia, and mineral salts constitute their pabulum; and these are taken through their exteriors, to be elaborated into compounds of the greatest complexity and variety. They pass into the interior of the cells by endosmose through the outer walls, and not through visible apertures; and must be in solution in water or in the gaseous state. The internal processes are for the most part characterised by deoxidation, no vegetable substance containing sufficient oxygen to convert its carbon into carbon di-oxide, and its hydrogen into water. This process of deoxidation reaches its maximum in the formation of hydrocarbons, composed solely of hydrogen and carbon, and its minimum in some organic acids, especially oxalic acid. The surplus oxygen is evolved by the leaves of the plant, constituting a kind of respiration, the importance of which in the economy of nature is well known. A few instances may be given of the decompositions of water and carbon di-oxide to illustrate these remarks.

$$2\ CO_2 + H_2O = H_2C_2O_4 + O$$
$$12\ CO_2 + 11\ H_2O = C_{12}H_{22}O_{11} + 24\ O.$$
$$10\ CO_2 + 8\ H_2O = C_{10}H_{16} + 28\ O.$$

Ammonia enters into the reactions which furnish the nitrogenous matters, such as albumen, gluten, and the long list of vegetable alkaloids, and those vegetable products which contain sulphur and phosphorus obtain these elements from mineral sulphates and phosphates. In the living plant we have, therefore, the great laboratory of nature, where, from the simplest materials, or, to speak more accurately, from the simplest binary compounds, a list of products is produced, whose number we shall never know until every species of plant has been exhaustively analysed. Dyes of every hue, medicinal agents of every variety of action on the animal economy, the blandest oils and the most corrosive juices, together with food for man and beast, are all produced, like the endless patterns of the kaleidoscope, from a few materials in endless permutations and combinations. The vegetable is the constructer, the renovator, which, by its living power, seizes on the dead matter and incorporates it with its own living structure. In the humblest forms of vegetable life, in the simple cell, we recognise its place among plants, if it takes in carbon di-oxide, water, and ammonia by its exterior surface, and evolves oxygen. Not that even this ground of distinction can yet be called absolute; certain amœboid forms of undoubted vegetables, especially an early stage of a fungus called Æthalium Septicum, and one state of volvox globator, are sometimes found with enclosed algæ, and other organised substances, which *may* serve as nutriment, though

I believe that this has not been proved to be the case. The yeast plant, as it can flourish in a solution of sugar, if ammoniacal salts and yeast ash be present, probably only derives its nourishment from albuminous substances, when, by their decay, ammonia is evolved. Carbon di-oxide is present in abundance, and it only remains to be shown whether oxygen is evolved. These are points which require further investigation, but in the mean time we cannot obtain a better definition of a vegetable.

In the animal the reverse chemical actions manifest themselves; instead of constructing it assimilates, instead of building it destroys; oxidation and not deoxidation is the dominant characteristic. The albumen, casein, and fibrin of the animal are derived from the albumen, casein and gluten of the plant, modified slightly in properties and composition, it may be, but scarcely distinguishable. The only marked instance of construction in the animal is the formation of fat from sugar. After assimilation comes destruction; having done their work, the tissues and fluids come under the influence of the oxygen with which respiration abundantly furnishes them, and at length water, carbon di-oxide and ammonia, or bodies which yield it with facility when out of the body, such as urea, are the sole remains of the structure reared by the plant. So far it is true that the animal assimilates and does not construct to any great extent; that gelatine, though a nitrogenous body, will not reconstruct tissue, its value as an article of food is highly problematical, and has been entirely denied; whilst saccharine and amylaceous food are only heat- and force-producers, and their value is produced by their destruction. We inhale nitrogen, but cannot combine it with other elements. The lower ranks of animal life still present the same characteristics; they must have ready-formed food; they feed on protophytes or protozoa, or dead albuminous matter; they take their food into their interior, digest it, and exhale carbon di-oxide.

This in its simplest form is the chemistry of living organisms; but, on investigating more closely, we find an amount of complexity which defies our analysis. The simplest form of living matter known to us is a mass of albuminous matter which assimilates and modifies like matter or forms it. But as we get a step higher we have a differentiation of parts. In the vegetable we have a cell not homogeneous, and we find a power at work which forms cellulose as a coating for the albuminous matter. From the same materials, and almost identical in composition, starch is evolved, and then fatty or oily substances. One cell begets another cell, which has a different office, forms different products, and has a different form. In the animal, the same increasing complexity meets us, and the question arises, What does chemistry teach us about this? Firstly, how is the machinery formed? The albumenoid substance composed of carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus, with numerous salts, is, so far as we know, formed only by living plants. These elements have no disposition to unite to form any but the simplest compounds, and nitrogen the characteristic element, is of all elements the most inert. Carbon di-oxide, ammonia, and water of themselves will unite to form carbonate of ammonium; but there, under surrounding circumstances, we stop. A living vegetable is required to elaborate them into that protoplasm which constitutes our starting point of living organisms. About the formation of this, chemistry is silent. We do not know the exact number of atoms which the best defined of the albuminous substances contain, and until we do, it is futile to attempt to form them. These substances do not crystallise, do not form definite compounds, and cannot be split into definite simple compounds. They are a group by themselves, which almost lead us to doubt about combination of elements in definite proportions being concerned in their composition. I do not say that we shall not know more about them in the future, but we now feel our ignorance, where our fathers in chemistry thought they had got knowledge. Who now talks of protein as a definite compound, and of its oxides? The chemistry of the present cannot form them, cannot give a hint as to their formation, and leaves them a legacy to the future. One of their most striking features is the difference in properties between their various varieties, combined with great similarity. Thus vegetable fibrin is only known to us as an insoluble substance, until we begin to act on it chemically; albumen becomes insoluble by heat, casein becomes insoluble by acids or by the action of rennet, yet they all give purple solutions with hydrochloric acid, are soluble in alkalies, and rotate light more or less to the left.

Secondly; given the protoplasm, the next stage to be considered is the manner in which the various products of vegetable organisms are formed. These are of two kinds. We find in a plant various substances in the solid state, such as cellulose, starch, chlorophyll, and a host of others; others are dissolved in the juices of the plant, as sugar, various vegetable acids, &c., many of which become deposited in the solid state as the plant grows. Some of these have, however, a definite form, not crystalline, but built up in such forms as starch granules, differing in form and size in different plants, but having the same chemical composition, and cellulose, in elongated cells, forming woody fibre. These are said to be organised, and these forms are beyond the reach of science to reproduce. Other vegetable products have not an organised form, and some of these have been made artificially, as benzoic acid, malic acid, aconitic acid, tartaric acid, oxalic acid, formic acid, acetic acid, alizaric acid, or alizarine, two remarkable sulphur compounds, oil of mustard and oil of garlic, and a base caffeine, from theobromine, mannite from glucose, glucose from starch and cane sugar, oil of bitter almonds, and a few others. It will be remarked, that the majority of these are acids, and they are all tolerably stable compounds. The progress made in this branch of chemistry has given rise to some adventurous speculation as to the future production of many valuable vegetable substances, now only obtainable from plants, such as quinine, &c.; and no doubt much will be done in this direction. The results already achieved go far to prove that a great harvest may be reaped by the industrious, systematic labourer.

The bearing of these discoveries upon the nature of vegetable life is, however, the point to which I would call attention at present. An argument has been drawn from them to combat the notion of a vital force, and they have been triumphantly paraded as proofs that chemical action can account for the phenomena of vegetation. It is said, the chemist in his laboratory can imitate the processes of nature, and the notion of any special vital force is unnecessary. I think the conclusion unwarranted, for the following reasons. The chemist for the most part does not employ the simple materials of nature, and most certainly he does not imitate her processes. If I and a bird wish to cross the Mersey, and we both attain the same end, namely, the other side, — I in a boat, and the bird by flying, — it can scarcely be said that I imitate the process of the bird. No more do we imitate the process of nature in making oxalic acid, whether we boil sugar with nitric acid, roast sawdust with caustic alkali, or even by passing carbon di-oxide over sodium. What relation is there between the process by which alizarine is produced in the root of the madder, and the production of anthracene, the heating of anthracene with nitric acid, the treatment of the oxanthracene with bromine in a sealed tube, and then the heating of this product with caustic soda? In one case, actions take place without visible intermediate steps, at one small range of temperature, and together with the formation of other substances the most opposite in their properties. In the other, varied processes gradually leading up to the final result, the employment of numerous extraneous substances, and finally we have the one valuable result. The madder root contains, besides alizarine, purpurin, rubiacin, xanthin, rubian, sugar, pectic acid, several resins, and the list ends with, "&c." Or take a recent analysis of the juice of the grape; we have grape sugar, fruit sugar, malic and tartaric acids, albumenoid substance, vegetable mucus, essential oils, extractives, mineral substances. It must be remembered that the word extractives means a number of substances of almost as indefinite and complex a composition as the albumenoids; and it is indeed the out-of-the-way corner into which the chemist sweeps up all the odds and ends which he does not understand and cannot separate.

Far more than the work of a laboratory is done without a laboratory; or rather, a laboratory with all the requisite apparatus is first elaborated, and then its products made; and also there is supposed the presence of a directing and inventing intellect in the one case, and the mere working out of laws by their own energy in the other.

In the living animal the processes appear more simple, and hence the greater attention directed to this portion of nature's kingdom by those who hold the opinion that chemical law alone guides the processes which take place in what we call the living being. Assimilation of an albuminous substance by an albuminous mass does perhaps present a distant analogy to the process of crystallisation, but clearly something more is to be found in an animal. The albuminous substance is not merely assimilated, it is modified. It becomes soluble, and is then converted into substances, which are only similar, and not identical. In this respect there is no analogy between the growth of a crystal and the increase of an animal organism, for the crystal only takes up like matter, and does not modify its composition or properties. The albuminous matters taken into the stomach must become soluble, and under the action of gastric juice are converted into peptones. This one of those chemical actions which are brought about by the presence of a ferment. Ferment action is a decomposition of one substance brought about by the presence of another decomposing substance, the products of which do not bear any relation to those of the other; as in the case of amygdaline in bitter almonds, which, under the influence of synaptase, takes up water and forms bitter almond oil, hydrocyanic acid, and glucose. Organised vegetable or animal substances often take part in these changes, but whether they are causes, or merely incidentally present, is not always certain. As to the rationale of ferment-action, we are in ignorance. What we know is the fact that, under the influence of a substance called pepsin and hydrochloric acid, albumen, for example, becomes converted into a peptone, soluble in water, not precipitated by acid or ferrocyanide of potassium. The peptone absorbed rapidly undergoes another change, as it is not to be detected in the chyle, it being again found as albumen.

Starch taken as food also undergoes changes under ferment action. The saliva first converts a portion of it into sugar, and the pancreatic juice finishes the conversion and consequent solution. Oxidation completes the destruction, resolving the starch into carbon di-oxide and water. This oxidation in the living animal is a very different thing to the oxidation of the chemist. He would be puzzled if he were asked to convert sugar totally into carbon di-oxide and water, at a temperature not exceeding 100° Faht., and with nothing but atmospheric oxygen to act on it with.

The various fluids of the animal organisation are of the most complex character. The chemical nature of saliva, bile, pancreatic juice, &c., baffles the most acute analyst entirely to unravel; and their action on the food is far from being thoroughly made out. The tissue formed is at once subject to the destroying influence of oxidation. Every muscular action is attended with death to tissue, which then slowly oxidises, until as urea it finally makes its exit from the system. It is generally assumed that the exercise of thought also destroys brain substance, but I do not know that this has ever been satisfactorily proved. Few animal organic products have as yet been artificially produced. Taurine, one of the constituents of bile, and urea comprise almost the entire catalogue, so that from this point of view we have less ground to claim animal life as the working out of ordinary chemical laws, than even vegetable.

So far we have seen what is the known amount of chemical action during what even the opponents of a theory of vitality must at present call life. That in some respect the building or assimilating organism differs from the same organism when it neither builds nor assimilates, but under the conditions of heat and moisture in which it once flourished, now rapidly tends to disintegration, is a fact, and is designated by the term living, though we must not take advantage of the use of a term, which an anti-vitalist must employ to make himself intelligible, though he does not mean by it what the vitalist does. What death is, and why, when apparently unchanged, an organism should cease to perform certain functions, are questions to which the anti-vitalist gives no reply. That there is a change, and that a great one, is shown by the fact that the distinction between animal and vegetable is now lost. The same changes happen alike to each, products of ever increasing simplicity are formed. If they do not become the prey of living animal organisms, under the action of air and moisture and heat the final results of decomposition are water, carbon di-oxide, and ammonia. Sulphuretted hydrogen, and sometimes phosphuretted hydrogen, are also formed, in turn to undergo further oxidation, and as sulphuric and phosphoric acid to return to the mineral kingdom whence they came. The cycle is now complete, and the ever-recurring course of events recommences, by the plant again combining these relics of the dead and investing them anew with life and beauty.

I think that a little confusion has arisen, in discussing this subject, from forgetfulness of the elementary laws of chemistry. Because, at all events, the well-defined products of the animal and vegetable kingdom are formed of fixed numbers of atoms, or rather of definite proportions of elements, it has been assumed that these have therefore been grouped together under known chemical laws, or from ascertainable chemical reactions. The only fact that we know is, that the elements can only group themselves under certain definite proportions; if there are atoms of fixed weight for each element, the law is a necessity; but what we do not know is, whether they may not be so grouped by the operation of other forces than those manifestations of chemical action which we can produce in the laboratory. The final resultant must have its elements in the proportions which we term atomic, though no reaction strictly chemical may have intervened. To take an example, and that lying at the root of all vegetable reactions; carbon di-oxide is not readily deoxidised by ordinary chemical means. To remove one combining proportion of oxygen, strong heat and a reducing agent must be employed, and we know of no chemical reaction which will separate it into carbon and free oxygen, or even carbon monoxide, and free oxygen. Another important point in connection with the consideration of this subject, is the apparent suspension of ordinary chemical action in the vegetable cell in certain cases. Who can preserve white indigo, or hæmatoxylin, or brazilin, &c. from oxidation, out of the plant, if free oxygen be present; or can reduce blue indigo, hæmateïn, or brazilein, by a process in which free oxygen is evolved? yet this is what takes place in the plant.

From the consideration of this subject, which I have imperfectly and briefly laid before you, I think that we may arrive at the conclusion, that we are not in a position to dogmatise on the question. Our knowledge of any department of it is small, and in many amounts to little more than entire ignorance. On a mere superficial examination of the processes of nature, they seem simple; but deeper insight reveals difficulties and mysteries which will find us work, I believe, for ever. I do not wish to rashly assert, what future investigation may contradict, nor to measure myself with opponents vastly my superiors in strength; but, on the other hand, I protest against being told that the whole matter lies in a nutshell, and that the question is at once and finally decided. I think I have grounds for doubt. I am sure that those who refer the phenomena, which are in question, to pure physical laws, have none for certainty. Even at the risk of being set down as a prejudiced dreamer, who refuses to awake to the enlightenment which has just inaugurated a new day of scientific truth,—a day cold but bright,—I think that Tennyson has no less weight of evidence on his side as he sings—

> "Flower in the crannied wall,
> I pluck you out of the crannies;—
> Hold you here, root and all, in my hand,
> Little flower—but if I could understand
> What you are, root and all, and all in all,
> I should know what God and man is."

NINTH ORDINARY MEETING.

Royal Institution, 21st February, 1870.

JOHN BIRKBECK NEVINS, M.D., President, in the Chair.

Jas. Macnamara Packer, M.D., was unanimously elected an Ordinary Member.

The following paper was then read:

ON THE FEMININE CHARACTER.

By the Rev. W. KENNEDY-MOORE, M.A.

The diversities of character among mankind are equal in number to the individuals of the race, although the constituent elements are the same in all. It is with the mind as with the countenance. Every face has the same features, and yet no two faces are exactly alike; so the same intellectual and moral faculties are the endowment of every individual, although they are in each case so differently proportioned that every man's character is an idiosyncrasy, that is, a mixture peculiar to himself. But although the diversities of character are thus practically infinite, and each man has his own particular constitution, yet there are general laws concerning character which may be reached by observation and induction. It is found that certain influences modify and control the development of particular qualities. Under a specified set of circumstances, one feature of character will be fostered and another will be repressed. We cannot indeed tell in the case of any single individual how far this process may have been carried, without actually making him the subject of our specific observation. Some persons have so marked an individuality, that they seem hardly capable of being in ever so small a degree anything different from what they are. And of those who do receive modification from a particular set of circumstances, that modification differs in its degree from those who barely show the mark to those who have taken the full impression. There is a style of character belonging to each profession, and most of those engaged in it shew the brand in greater or less degree. Clergymen, when they go on their holiday excursions, seek to disguise themselves in coloured neckties and wide-awakes, sedulously eschewing starched cravats and M. B. waistcoats, but they are soon discovered by their inveterate habit of moralising and alacrity in making mistakes. The physician of our times does not go about, as Hogarth pictures him, holding to the end of his nose the gold-headed cane, within which are concealed the specifics against infection. But whether he wears no indelible mark of leechcraft, I shall leave the members of the Society to determine, from the first-rate specimens we have the privilege of observing, filling this chair and occupying those benches. And thus it is with the other occupations of mankind. In all of these, the dyer's hand is subdued to what it works in. Education, social position, and physical surroundings have much to do in modifying character; and perhaps the combined influence of a number of causes can be best appreciated when we compare the men of different ages and countries. Every nation has its distinctive type of character, and this can be best observed in regard to the great leading races of the ancient and modern world.

The question we have to consider in this paper comes under the general question of the modifications of character and their causes. We have to ask whether difference of sex does tend to produce different types of character, or whether it does not. Speaking generally, and making allowance for the infinite diversity of individual manifestations, may we still say that women differ appreciably from men.

We may first observe, that, whatever difference there may be, it cannot comparatively be very great nor reach very far· We are all gifted with the same great humanity, endued with the light of reason, enriched with conscience, and stored with many a kindly affection. Those faculties which crown man as lord of this lower sphere, set their royal seal on the brow of every child of Adam's race. That inward eye which beholds the truth of things, that hidden sense which draws a joy from the glory of the universe, those instincts after the just and good,—that will which makes use of our other powers and restrains or directs their exercise,—these are the rich possession of every being in the great human family. In all these things, woman still is man, as also in that greater dower of immortality which belongs to us alone of all the creatures which inhabit this earthly globe. Woman still is man, and the very word woman says as much, formed as it is from man with a syllable prefixed. Hence the rule in speech, that man includes woman, unless there be something to indicate that what is said is limited to the stronger sex. This I fancy is a legal canon of interpretation. It ought certainly to be attended to by those of my own profession in their exhortations to their hearers. There is nothing more odious to my ears than to hear, as I have actually done, a minister make use of a sentence like the following: "Let every man for himself, and every woman for herself, examine his or her life to see whether he or she does what is proper for him or her." In such cases as this, man includes woman; we will not say on the mathematical principle that the greater includes the less, but on the logical principle that a class includes all subdivisions. In several languages, though not in English, we have two words for man, one of which has reference rather to the species, and the other to the sex. Thus in German, we have *Mensch* and *Mann*. In Latin, *vir* is the proper masculine, and *homo* the generic designation. In Greek, the word ανηρ corresponds to *vir*, and ανθρωπος to *homo*. In Hebrew, the word Ish is man, as opposed to Isha, woman; while the word Adam denotes man, as opposed to the irrational creatures. In the fifth chapter of Genesis, the first and second verses run thus, "In the day that God created man, in the likeness of God made he him, male and female created he them, and blessed them, and called their name Adam, in the day when they were created."

We have begun by laying down the principle that woman still is man, and therefore, partakes in all the great endowments of humanity. We may notice, next, that woman is man specialised. She does not so much present to our view humanity in its general conception, as humanity adapted for a particular end. In point of fact, most men are specialised in a certain sense, or to a certain degree. A soldier is a man specialised to fight, and a judge is a man specialised to administer justice. But the difference between such specialisations as these, and the one we have to do with, is this, that they are founded in men's voluntary acts, and in the arrangements of society, whereas in the other case nature has taken the matter into her own hand. She desired to preserve her crowning race to carry on from age to age the achievements of their mighty history. As the thinkers and the workers of one era passed away like the fading generations of forest leaves, others were to be reared and nurtured to take their place, enter into their toils, carry on their heroic struggles, or reap the rich rewards of their bygone efforts. That her purpose might run no chance of failing, she herself has made provision, at each stage of time, of those whom she has appointed and designed to be the mothers of the coming race, whose office is to link together the successive generations of human kind. While retaining those endowments of head and heart which they have as belonging to mankind, they are yet prepared for a special task. This idea is brought out in the very name imposed on our first great mother. In the twentieth verse of the third chapter of Genesis we read, "And Adam called his wife's name Eve, because she was the mother of all living." The original word which is rendered Eve in English is Chava, derived from Chai, which signifies life, and is the closing word in this very verse. Eve may then be translated as the living one, the source of life. In most languages, I fancy the name of woman has reference to motherhood. It is so in our own tongue,* and in Greek and Latin, and there seems reason to believe that this will be found to be pretty generally the case, as the reason for it is sufficiently obvious. An anecdote is related of Madame de Stael and the First Napoleon, which has some bearing on our present subject. No love certainly was lost between the gifted daughter of Neckar and that astonishing man, whose military genius was already clearing the way for him to the Imperial crown. They met, however, on one occasion, in the saloons of Paris, and Madame de Stael, no doubt by that brilliance in conversation she so largely possessed, was dividing the admiration of the illustrious company with the rising young soldier of fortune. Having secured his attention, she thought fit to put to him a question, which doubtless indicated the channel in which her thoughts were accustomed to run. She asked, Who was the greatest woman of whom we have any information? She who has borne most children, replied Napoleon, curtly, and turned away. This answer, certainly, could not have been expected, nor yet could it have been very agreeable. The rudeness of the reply, no one, I suppose, would feel inclined to justify. Nor was Napoleon right as to the matter of fact, so that his answer was no more true than it was courteous. But no doubt that which made it so stinging was the circumstance that it seemed to be based on a natural principle. The mistake was in ranking the physical side of life above the intellectual and moral, which is no more just or right in regard to women than men. The whole of what a woman is can no more be estimated by a view to a special function, even though it be of nature's own designing, than a man is to be judged by the special labour to which he is appointed in the arrangements of society. Who is the greatest tinker, one may ask, of whom we have any information? And the answer, founded on Napoleon's, might be, He who has mended the greatest number of tin kettles. Or, Who was the greatest exciseman? to which it might be replied, The man who has gauged the most whisky-casks. But the absurdity of such replies is evident. We think at once of the tinker of Elstow, who, whatever may or may not have been his achievements with tin kettles, has made his name immortal, and has done a service to all generations of mankind with his matchless allegory, the *Pilgrim's Progress*. Or, again, the image rises before us of that ill-fated genius whose ashes sleep beside the Nith, but whose songs of patriotism and love have girdled the whole globe. Bunyan and Burns are to be judged of as men, and not by their particular profession; and so is woman also to be measured, by those higher endowments of mind and heart which are hers, and not merely with a view to a special designation. If Napoleon's dictum were correct, the large-limbed, large-fisted mistress of some Irish hovel, surrounded by her brood of squalid, screaming, fighting imps, should be counted worthy of greater honour than the heroic mother of the Gracchi, than the gentle authoress of the *Graves of a Household,* in whose fame this bustling town of ours claims some little share, than the lady to whose honour Florence has inserted a marble tablet into the wall of the house she dwelt in, whose memory her poet husband has adorned in *The Ring and the Book.* Lord Bacon makes the remark, in one of his brief and weighty *Essays,* that "childless men have usually been the great benefactors of their kind." Those powerful affections, for which the ordinary absorbing channels were not provided, diffused themselves over a wider space, and instead of concentrated and narrow family regards, we have expansive beneficence and distinguished public service. Perhaps this remark applies with still greater force to the tender sex. Those of them whose names and memory have become a part of the rich legacy of Time, have usually had to pay the penalty of their greatness in a certain loneliness of life.

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* Woman is womb-man.

> With only Fame for spouse, and their great deeds
> For issue, yet they live in vain, and miss
> Meanwhile what every woman counts her due—
> Love, children, happiness.

We have dwelt so far on these two ideas, that woman in all the essential qualities of humanity is the same as man, and then that she is specialised by nature with a certain view. We have not entered on the question, how far this specialisation affects or modifies the character. It is possible to imagine that some may hold that it has no such effect at all. It may be argued that the distinction has reference merely to the physical side of our being, and has no influence whatever on the intellectual and moral qualities. This view would put the two sexes on an absolute level, or, rather, make them identical in all that concerns the heart and mind. Under this theory, there would, properly speaking, be no such thing as a feminine character. Let this phrase not be misunderstood. It is not meant that women would have no character, but that they would have the same character in all its strength and fulness that men possess, the same intellectual and moral qualities unaltered and unmodified. Those who hold this view, instead of deeming it an uncomplimentary thing to assert there was no feminine character, would, on the contrary, hold that this was the highest compliment you could pay to women. It would certainly assert the equality, or, rather, the identity, mentally and morally, of the sexes in the strongest possible way. Those who hold this view can hardly hold it in its bare and absolute form. It is far more likely to be held with a modification, which would not, however, affect the essential character of the theory. The modification would be something of this sort. It will be acknowledged that there is in point of fact a distinctive type of character, which we commonly find belonging to women. But it will be denied that this has its source in natural constitution. Other sources will be pointed out, to which its origin is to be traced. These sources are mainly two, viz., education and social position. Women, it is argued, have never received the same advantages of education as men. They have never been fully and systematically trained to a mastery in the world of knowledge. The mere elements of learning, or some poor superficial accomplishments, have been thought good enough for them, if even these have been accorded. Woman has thus been treated most unjustly, and that throughout the whole history of the world. She has never had fair play; and hence it is that, though her powers naturally are quite equal to those of man, she has appeared permanently to stand at a lower level. Let the system of female education be altered, and we shall see all this reversed. Give her intellect the same food of truth to be nourished on; give her faculties the same elaborate and long continued training, and then will it be seen that there is no natural disparity between the sexes, but that what the man is in force and intellect that the woman also is; no more, it may be, but certainly no less.

> Convention beats them down;
> It is but bringing up, no more than that;
> You men have done it.
> Some said their heads were small;
> Some men's were small, not they the least of men,
> For often fineness compensated size.
> Besides, the brain was like the hand, and grew
> With using; hence the man's, if more, was more.
> He took advantage of his strength to be

First in the field: some ages had been lost,
But woman ripened earlier, and her life
Was longer, and albeit their glorious names
Were fewer, scattered stars, yet since in truth
The highest is the measure of the man,
And not the Kaffir, Hottentot, Malay,
And these hornhanded breakers of the glebe;
But Homer, Plato, Verulam; even so
With women, and in arts of government
Elizabeth and others, arts of war
The peasant Joan and others, arts of grace
Sappho and others, vied with any man.

The difference of education is thus made responsible in part for the difference in character we see actually existing. But still greater stress is laid on the other point we mentioned, namely, difference in social position. Woman, it is said, has always been kept in undue and unnatural subjection. She has always been the slave of man, though her bondage has not always been equally harsh. In savage communities, her condition has been hard and her treatment execrable. She has been a mere drudge, a tool, a beast of burden. She has had every heavy and disagreeable task thrust on her, while the man has indulged himself in idleness, save when roused by the passions of war or the excitement of the chase. In more civilised societies, woman has been petted and fondled, decked with jewels and finery, kept in ease and comfort, and treated with great deference and courtesy in the idle hours of social intercourse. But she has been a slave for all that, and so still continues to be. In her early years, she is a slave under her father's will. And from him, in her riper womanhood, she passes into the husband's house, to submit herself to his domestic sceptre. If by any chance she be left free from paternal or marital tyranny, she is sure to fall a prey to some brother, guardian, executor, trustee, or other despot of like kind. But she never by any chance attains to the enjoyment of that freedom for which she was naturally designed, and of which she has been so constantly and so unjustly defrauded. Her chains are not always of iron, hard, heavy, and grievous. The bonds are sometimes of the softest, smoothest silk; but they hold her fast just as securely, and make the possibility of freedom just as much a dream as the harshest fetters. She may be a favourite, who is much made of, and even much beloved, but she never ceases to be a bondswoman. And what can we expect from long ages of such bondage, but that the character should be dwarfed and stunted? Woman has been so subdued that she has accommodated herself to her subjection. She is proud of her chains, especially when thèy can be borne without galling the flesh, when they are smooth to the feel, and look bright and beautiful to the eye. But once rouse in her bosom the generous spark of indignant self-asserting freedom, but once cease to withold her proper heritage of independence, and her character will rise, her powers wiil be enlarged to the fulness of their natural growth, and she will take her place side by side with man—in all points of moral and intellectual endowment, his companion and his equal.

With regard to the whole of this reasoning, I would simply make one or two general observations. It cannot be denied that women have been very unjustly and hardly dealt with in many nations, and at different periods of the world's history. Nor would I like to hazard the assertion that there are no laws at present in force among ourselves but such as are perfectly just and wise. The general principle upon which all legislation should proceed is this. Laws should follow nature; that is, their enactments should be in harmony with the truth of things. They should operate in concert with those natural laws which bear upon the welfare of men and society. If this principle be admitted, it follows that distinctions ought not to be established by law which do not exist in nature. Nor, on the other hand, should such distinctions as nature has established be ignored in law. Certainly the current of our times is rapidly sweeping away all mere artificial distinction in society, and so far, perhaps, all is well; but there is a possibility that efforts may be made to abolish the ineffaceable landmarks of nature's own erecting, and any such attempt, if made, is certain to be fraught with mischief. With regard to the matter in hand, although we were to concede the possibility of some remaining unfair and hurtful legal or social regulations, I do not think we can by any possibility allow that the general description of the state of the case as given above is really correct. Woman, among us, is not a slave in any proper sense of the word. To describe her as such is a mere abuse of language. Nor is the position she actually occupies at all unfavourable to the development of her character and powers. On the contrary, it may be very justly asserted, that it is eminently fitted both to secure her welfare and draw out all that is excellent in her. And of this I have no doubt whatever, that the effect of some of the changes that are advocated now-a-days would be simply disastrous. The general principle, that woman is naturally in mind the same as man, that the feminine character, except for external modifying causes, would be the same as the masculine, or, rather, that there would, but for these unfortunate circumstances, be no feminine character at all, is a principle which I think most people will be slow to admit. The general impression among mankind has always been that there is a difference, though they may not be able to specify exactly what the difference is. We may accept this general persuasion as a strong presumption in favour of such a difference actually existing. I proceed to enquire more particularly into its nature.

In order even to approximate to a true solution of this question, it seems evident that we must start from that idea of motherhood of which we have already spoken. Now, the first obvious quality which seems to flow from this is, that fondness for little children which is a striking characteristic of the tender sex. I do not mean a desire for offspring, the wish to have little ones of our own, who are born of our blood, and are the heirs, as it were, of our life. This is one of the deepest instincts in our nature; but I do not know that it exists more strongly in one sex than the other. In many cases, and especially in that of families of historic lineage, hereditary title, or large possessions, we might not be mistaken in supposing that the desire for an heir was a keener and intenser feeling with the head of the house, than even with his spouse. There is a distinction between this desire and the feeling we spoke of as characteristic of woman. The latter is a fondness for very little children,—for babies, in short,—in which I do not think men commonly share. An instinctive interest and delight in nurselings is a marked feminine peculiarity. It shews itself very early in life, for you see very diminutive creatures of girls, wee things hardly able to toddle themselves, whose bunchy little hands and plump dimpled arms are busily engaged in nursing and carrying about and dressing Dolly. The motherly instinct seems especially early developed in the children of the poor, and I dare say we all have seen a lassie of five or six years of age carrying about her little sister or brother, and watching over and amusing the baby most lovingly. The difference between boys and girls in this respect is very cleverly hit off in one of those amusing pictures which have made *Punch* so popular. A little baby is brought out for exhibition to a number of young ladies, who all set up a chorus of delighted exclamations. O, what a dear! What a darling! O it is the sweetest, prettiest pet; the dearest darling! Did you ever see such a beauty? In the corner, meanwhile, stands a horrid, plain-spoken boy, who disburdens himself thus; I think it 's a nasty, ugly little beast, for all the world like a cat or a monkey. I am afraid it is unfortunately only too true that gentlemen usually give a wide berth to babies, especially in railway travelling. I have heard ladies say that gentlemen think all babies are alike. Very good papas might, I dare say, be easily enough imposed on in this matter, and made to believe that some other brat was their own precious bantling. And I have no doubt whatever, that, on many an interesting occasion, the whole assembled female coterie, from the excellent old lady who has just attained to the honour of being a grandmamma, down to the nurse who has carried in the little stranger, have been dreadfully disgusted at the want of appreciation of the loveliness of the infant on the part of its paternal parent. A learned man, and a great friend of my own, once spoke to me of his growing experience of the feelings of fatherhood. He said that he was not conscious of any affection towards his little one when she first appeared. As a nurseling of a few days old, it had no special interest for him. But as it grew, he felt drawn to it more and more. He began to watch the little movements of the strengthening limbs and the tokens of new intelligence in the beaming little eyes and face, until at last his affections had twined themselves most firmly round the dear babe, and he felt a want whenever it was out of his sight. I shall not presume to say, whether the experience of my friend is in all respects a typical one, but we may accept it as a fact that such was the history of his parental affection; and we cannot but feel at once how great the difference is between such a love and that fond, absorbing, all-engrossing attachment to the babe which the mother shews. This peculiar maternal affection has been provided by kind Nature's fostering hand, to enable the mother to go through that heavy task of tending, watching, and perpepetually caring for her little one which is needful for the welfare of its tiny life. I have no doubt that the constant payment of these acts of care and kindness is, after all, a real gratification to the female heart, and twines the tendrils of its affections inextricably round the little object of all those offices. Mothers love those children best whom they have nursed themselves; and I fancy even hired nurses, if truly womanly in their character, never cease, even with the lapse of years, to retain an affection for those they were paid to rear.

The gifted authoress of *Aurora Leigh* remarks that—

> Women know
> The way to rear up children (to be just).
> They know a simple, merry, tender knack
> Of tying sashes, fitting baby shoes,
> And stringing pretty words that make no sense,
> And kissing full sense into empty words.
> Which things are corals to cut life upon,
> Although such trifles. Children learn by such
> Love's holy earnest in a pretty play,
> And get not over-early solemnised.
> But seeing, as in a rosebush, Love's divine,
> Which burns and hurts not, not a single bloom
> Become aware and unafraid of love.
> Such good do mothers. Fathers love as well
> (Mine did, I know), but still with heavier brains,
> And wills more consciously responsible,
> And not as wisely, since less foolishly.
> So mothers have God's license to be missed.

In consequence of this peculiar clinging to the little ones, we can understand how the loss of an infant is such a dreadful blow to the bereaved mother. Perhaps few tears are more bitter than those shed over the tiny coffin of the little child. It seems as if the tearing of those tendrils which bound the babe to her bosom makes the mother's very heart to bleed. This point has been frequently noticed in the writings of one who, under an outward covering of a cold and cynical philosophy, has touches of the truest and deepest pathos, as well as uncommon insight into the peculiarities of the feminine character. In one of his shorter sketches, for instance, Thackeray tells us of a young married couple, who lost their first child when five weeks old. The husband is made to remark that they had lived together happily since then for many years, and had other blooming ones who had grown up around their knees; yet that he often knows, by her remarks, that his wife is thinking of their first-born, and that she has treasured up in her mind, as holy and most precious remembrances, everything connected with that little one, who was so soon snatched away. In his most famous work he closes a touching passage with these words. "By heavens! it is pitiful; the bootless love of women for children in *Vanity Fair*."

The next feature of feminine character on which we shall just touch, is that of native modesty, or sensitive purity of mind and feeling. The integrity of family descent is specially under the guardianship of woman. As this is a matter of the highest consequence, legislative safeguards have been abundantly provided to fence it round; and, what is unspeakably more effective, a strong sentiment of female honour has been evoked, the influence of which can hardly be overrated. This peculiar manifestation of the sentiment of honour has its foundation, however, in nature itself. Every ingenuous mind, indeed, has a quick sense of shame. When this is altogether destroyed, whether in man or woman, the moral character has reached its lowest pitch of degradation. The rough commerce of life is, however, apt to blunt this sensitiveness in men, unless they are careful to maintain and cultivate their finer and better feelings. To those blunting influences women are less exposed, and perhaps we do not err in supposing, that even naturally, their sensitiveness is quicker than with us. Pudicity, to naturalise a Latin word, for which our language has no other exact equivalent, is a quality that belongs to the very essence of womanhood. Modesty is woman's choice adornment. The charm and fascination of feminine loveliness cannot exist without it. And herein is it that the refined and excellent of the gentler sex have so vast a power in preserving the purity of society. Their influence counteracts those degrading and lowering influences of which the world is still so full; and we may safely say that the man who counts such among his friends is under very favourable circumstances for ripening into full sweetness and nobility of character.

The next point we may notice is one of much smaller importance than those on which we have already dwelt. It is the desire to be attractive in person, connected with a quick taste in all matters of adornment. The power of fashion among women is a fact of which we have every-day experience; and the vagaries that have marked its sway have furnished matter for amusement to the caricaturists of all ages. Nor can it be questioned that the love of dress and ornament acquires all the mastery of a passion over some women, and often leads to most disastrous issues. We do not mean, however, to assert that there is nothing of a similar sort among men. It is with reference to our sex that Shakspeare puts these remarks into the mouth of Borachio. "See'st thou not I say what a deformed thing this fashion is? How giddily he turns about all hot bloods between fourteen and five and thirty! Sometimes fashioning them like Pharoah's soldiers in the reechy painting; sometimes like god Bel's priests in the old church window; sometimes like the shaven Hercules in the tarnished, worm-eaten tapestry." To which Conrade replies: "All this I see, and see that the fashion wears out more apparel than the man."

I am afraid it must be confessed that the brood of coxcombs and fops, of bucks and dandies, has never been very scarce. Yet for all that I think it may be held that the taste for personal adornment is more constant and powerful among women than among men. Nor, in saying this, do I intend it as a disparaging remark. My conviction is that tastes and feelings of nature's implanting must be intended for good, though they may be turned to evil. The taste for personal attractiveness is one of the civilising influences of life. It tends to produce, and is characteristic of, refinement. A gentleman, and above all, an English gentleman, will never suffer his perſon to be repulsive from want of cleanliness or neatness. And among the lower classes, we have abundant opportunity for noting how the lack of care for attractiveness in house and person is an unfailing mark of considerable degradation. By her delight in the tasteful and beautiful, woman exercises a refining influence. She helps to make home attractive. By pleasing his eye, she keeps a greater hold on her husband's affections. And those charms of beauty, with which nature has gifted her, which are her crown of glory, are set off to fuller advantage, and made still more to be a source of joy and gladness.

The next point I shall mention is one which seems to me to enter peculiarly deep into the feminine character. It is the inborn and irrepressible craving which woman has to be herself an object of affection. So marked a feature is this in her nature, that it seems to me hardly possible to conceive of any woman as destitute of it. This, perhaps, is the distinctive mark of her special nature. No doubt, in the bosom of the man, the same feeling has its place. The human heart craves for affection, and is dissatisfied and unhappy without it. Man was not made to be alone, and our spirit demands sympathy and love as much as the body hungers for food. It is remarked by Bacon, that love occupies a larger place in poetry and drama than it does in real life. This is doubtless true. Novels wind up with a wedding, at the end of the third volume; but we know well enough that a great deal of life comes after, and that there is a very great deal in the battle of life with which love and marriage have very small concern. Still, the very fact that poetry and fiction deal so much with one passion, shews how deeply it enters into human life. And we may justly say, that the securing of a deep, pure, and constant affection is one of life's greatest prizes; one on which our happiness, and even our mere outward success, very much depend. Still, I think we may come back to the point we started from, and hold that the intense craving to be beloved is a feature of the feminine character. There is a familiar illustration, which, I dare say, has been used in literature ever since literature began, and doubtless was employed long before the first book was written, and might have been suggested to the first pair of human kind in Eden itself. It is that which compares the man to the tree and woman to the climbing plant. The first maintains its own erectness of growth, but the other seeks for some support, round which to clasp its tendrils. Like other images, this one must not be pressed too far; but yet there is a great deal of truth in it. Man plays for many prizes, but woman's only stake at the game of life is that of affection. Ambition and avarice are two great passions which dispute the mastery with love over man, but woman's life is simpler in this respect, and she remains under allegiance to one enduring principle. We may make a short digression here, for the purpose of considering how this point bears upon the question of the so-called subjection of women. That the husband should be the head of the house, is not a rule that depends for its force on any legislation whatever, or any mere inveterate prejudice, or any established custom. It is founded in the very nature of things. If it is iniquitous and wrong, the blame rests on nature herself. Man has been made stronger than woman. There is a difference between the development of bone, sinew, and muscle in the one sex and the other. And even if woman were quite as powerful in frame as man, it would not affect the question very materially. In the normal course of things, she must be incapacitated for that continuous toil which is needful in most of the walks of life. Nor has she, nor is it desirable she should have, that hardness of character which is necessary to success in all public spheres. In a regular and quiet line of business, she may do something, but such great successes as are achieved in the rough and public places of the world, she cannot contend for. Hence it is that money, the great payment for all labour, is made almost exclusively by men. Hence it is that owning the house, and providing for the sustenance of all in the house, it falls to him to be the constitutional monarch of the domestic world. Like other general rules, of course, this has its exceptions. Those of you who have been in Edinburgh will remember the musical cry and picturesque appearance of the women who belong to the fishing community at the village of Newhaven. These sturdy dames furnish a by no means unpleasing picture with their snowy caps, many coloured petticoats, and brawny shoulders, sustaining their creels loaded with the finny spoil. Their muscular development is splendid; and it is a very well understood thing, that in their little world it is the woman who rules the house. When a lassie, of whom the neighbours do not entertain a great opinion, is about to enter the ties of wedlock, the good gossips may be heard exclaiming, "Eh! she is a puir feckless thing; what can she dae with a man?" A Newhaven woman well explained the whole theory of the subject, in these words; "The husband catches the fish, but the wife goes to market. She sells the fish, and the one that sells the fish keeps the purse, and the one that keeps the purse rules the house." This is constitutional logic. In this country, the House of Commons has become really supreme, because it has the power of the supplies. In savage life, brute force gives mastery; but with the advance of civilisation, money takes the place of muscle, and the long purse is king instead of the strong arm.

I have said the husband is constitutionally the monarch of the household. But we all know that in constitutional monarchies, like that of our own country, the real sway falls into the hands of the ablest statesman. So is it also in the domestic world, where the wife is cleverer than the husband. Though she may appear always to defer to his wishes, in point of fact her natural superiority gives her the real guidance of the household.

Taking it for granted, however, that the normal position of woman is that of occupying the second place, I think that the representation of this as a humiliating or unhappy condition is altogether false. The peculiar character of woman's affection, I think, is exquisitely adapted to this very end. As we have seen, her peculiar passion is to be the object of love, the recipient of affection. She has a twining and clinging nature, and demands some stronger object round which she may wind herself. That object may be less noble and excellent than she is; but it is with her as with the vine, which may clothe with its leaves and adorn with its clusters some poor and barren stock.

In proportion to the demand for affection which belongs to woman's nature, is the power of lavishing and spending affection in return. In the finest natures these two things are commensurate; and we fain would give our love even as we desire to get love in return. Woman has an immense, I had almost said an infinite, treasure of affection, which she most freely and fondly spends. It is a noble and touching quality, and an invaluable one to man. When the proper natural channels are provided, it is amazing to see what a force it has, and what it will accomplish. And where it is shut out from these natural channels, the manifestations of the feeling are sometimes both pitiful and ludicrous. Hence those wonderful friendships of school girls and very young women for each other, which, like Jonah's gourd, spring up in a night to full maturity, and very often die away as quickly. Here also have we the clue to the traditional cat and parrot, which comfort the loneliness of the solitary single lady. Such a lady once remarked, "I am an old maid, and must have something to love." As for the treasure of constant, pure, self-denying affection bestowed by maiden ladies on their sisters' children, I don't know how the world would get on without it. It has been said the best of women never marry. I should not like either to deny this or affirm it; but I know a gentleman who advised a friend of his to marry the pretty sister, and get the good one to live with them : an arrangement perhaps oftener made than talked about. And the sentiment is no less just than kindly, expressed by Ballantyne, in one of his Scottish songs :

O how may hand-bound Minnie get
  Her tottums clad sae gaily?
The youngest aye is Aunty's pet,
  Wha brings him presents daily.
An' wha wad take the orphan's part,
  An' twine for him the plaiden
An' 'twerena for the kindly heart
  O' his dear Aunty Maiden?

Oh! mutual love is mutual bliss;
  Young mous were made for preein!
An' when we pree the half-stown kiss,
  We 're getting whaur we 're geein!
But there 's a love seeks nae return,
  Frae them wi' pourtith laden;

A heart to beat for them wha mourn,
  A kindly Aunty Maiden.
Then twine it weel, and twine it weel;
  Then twine it weel, the plaiden;
There 's nane ere twined or toiled for me,
  Like my auld Aunty Maiden.

A question may be raised here, as to whether there is greater constancy in affection among women than men. The authority of the great dramatist seems to be in their favour, if at least we suppose Shakspeare expresses his own opinion, in the words he represents the Duke, in *Twelfth Night,* as addressing to Viola.

For, boy, however we do praise ourselves,
Our fancies are more giddy and infirm,
More longing, wavering, sooner lost and worn,
Than women's are.

To determine this question is not easy. The ballads and songs of all lands and times have been full of the praises of constancy on the one hand, and complaints of desertion on the other, and these seem to be shared pretty equally between the two parties in the relation of affection.

Passion and pathos, love and sorrow, rapturous eulogy and heartbroken complaint, have always been, and always will be, the burden of this poesy. Legends celebrate the unaltered truth of such pairs of lovers as Hero and Leander, as Pyramus and Thisbe. In the Hebrew writings, the only tale of passionate wedded love is that of Jacob and Rachel, in which it is he, and not she, who displays its power. We have indeed an intense constancy of affection, in another relation, in that most beautiful pastoral tale of Ruth the Moabitess; but over against it we may set the love of Jonathan to David, the most striking story of friendship with which the world has been enriched. If the measure of grief be the measure of love and constancy, we have the widow of Mausolus, who erected that magnificent monument which has given a designation to every splendid place of sepulture. But, on the other hand, there is the Taj-Mahal at Agra, one of the sweetest gems of architecture, in its marble whiteness, its airy dome, and inlayings of gems, erected to the dear memory of a beloved queen. I am inclined to think that, while as great and striking instances of constancy have been shewn in the one sex as in the other, yet on the whole the manifestation is more common on the woman's side. Indeed it seems to be made almost a reproach to woman, that she should continue to waste her affections on one who has proved himself utterly unworthy of them. In the character of Amelia, this weakness has been pourtrayed by a master hand. It is introduced by Hogarth, in his series of the Rake's Progress, where, however, it rather mars the unity of the conception. It is an idea rather frequent in literature,—and I am sorry to add I am afraid it is a fact by no means uncommon in life,—that a poor woman has given her heart to a base unworthy wretch, and never ceases to love him to the end of the sad and melancholy story. Let me say, however, that while this in one point of view may be looked on as a weakness, in another aspect it is one of the divinest qualities in our fallen nature. The greater and more noble and generous the spirit, the more unwilling is it to believe that what love has been bestowed has been bestowed in vain. We will not willingly abandon enterprises in which we have put out our money and our toil. We would rather spend more and labour more, in the hope of achieving our desire at last. Much less can we be willing to let go our hold of that on which, as it were, we have spent the very life of our hearts. Our very spending of the affection binds it to us by bonds which may be exquisitely painful, and yet which we will not sever. Let me only remark further, that we have set before our eyes, in our own day, a story of life-long sorrow for the departed, in the royal lady who rules these realms. Whatever difference of view there may be on this point, there can be none on the next we shall mention, which is, the fitness of woman to minister to pain and trouble. I have seen it stated in a physiological article, that women are less sensitive to bodily pain than men are, at least, than men of fine organisation. Whether this be so or not, I cannot say; nor do I understand what means there can be for reaching any conclusion whatever on this point. But I think it may be fairly admitted, that commonly women bear pain more patiently than men. I dare say we have all been both amused and annoyed, at seeing great big burly fellows fret and fume and fidget when the least thing has befallen them; and I should not wonder if a good many of us had made fools of ourselves in that very way. No doubt there is a Stoic power in man, called out by great troubles, but this power of stern endurance is apt to be connected with want of sympathy. The spirit gets hardened, so as to feel less itself and have less fellow-feeling for others. But woman's quiet, much-enduring, uncomplaining spirit is united to a very pitiful and compassionate nature, and great readiness to feel for another's sufferings, according to the line put by Virgil into the mouth of the unfortunate Carthaginian queen—

Haud ignara mali miseris succurrere disco

I well have known the pangs of ill and grief,
And to the wretched long to bring relief.

The lines of Sir Walter Scott, in the death-scene of Marmion, are well known—

O woman, in our hours of ease
Uncertain, coy, and hard to please,
And variable as the shade
By the light quivering aspen made.

When pain and anguish wring the brow,
A ministering angel thou.

This idea of woman's destiny is most touchingly brought out in Mrs. Hemans' poem, entitled *Evening Prayer in a Girls' School,* from which I shall quote a few lines—

Yet in these flute-like voices mingling low
Is woman's tenderness—how soon her woe.
  Her lot is on you—silent tears to weep,
And patient smiles to wear through suffering's hour,
  And sumless riches from affections deep
To pour on broken reeds—a wasted shower;
And to make idols, and to find them clay,
And to bewail that worship. Therefore, pray
Her lot is on you—to be found untired,
  Watching the stars out by the bed of pain,
With a pale cheek, and yet a brow inspired,
  And a true heart of hope, though hope be vain:
Meekly to bear with wrong, to cheer decay,
And oh, to love through all things. Therefore, pray!

There is a story of the true-hearted, gentle ministry of women to the Man of Sorrows, to which I can do no more but make this passing allusion. But this may serve to introduce the next point I would touch on, namely, the great place the religious element possesses in the feminine character. This has been made indeed a matter of reproach to women, that they are so easily beguiled by devout impostors, are so deeply tinged with superstition, and can be so completely carried away by the tide of religious enthusiasm. When these charges are made, in which we must allow a certain measure of justice, let us also remember that the weaknesses of a character are connected with its strength. One falls on the side on which he leans, as the present French Emperor said in his famous letter. Our excellencies and foibles are twin to each other. And if woman be more a prey to delusion and superstition, it is just because pious aspirations and religious emotions are so powerful in her nature. Whatever evils may have occasionally resulted from this peculiarity of constitution, we cannot but hold that it is an honour to the gentler sex, that, in the highest element of our being, she should have so large a share. The more our faith takes hold of unseen and infinite realities, the more our love goes out to the divine and heavenly, the higher shall we esteem, and more dearly shall we prize this pure, ennobling element in woman's nature.

In my remarks, so far, I have endeavoured to follow out a consecutive line of thought. My few remaining observations will be of a more fragmentary character. Let me just notice again a point I have already mentioned, namely, that woman not only differs from man in a special function, but also in a greater general delicacy of the physical constitution. Now, from this greater bodily weakness, I am inclined to draw the conclusion that what may be termed the physical sensations or passions exist in proportionably less force. In *Shirley*, the second story by Charlotte Bronte, we have a little incident recorded to this effect. The heroine, who is an heiress, has a plan in view, which can only be carried out with the good-will of the three parsons who rule the three parishes of that neighbourhood. She accordingly invites them to dinner, and deals most hospitably and kindly with them at her table, and thus gets the better of all their prejudices and reluctance. One simple honest soul does not see at all that he is being manipulated; a second has a dim conception of something suspicious, but does not know what to do but follow; the third, a keen, shrewd, quick-eyed old boy, sees well enough he is being led by the nose, but, under the soothing influence of the dinner and the wine, thinks it better just to go along quietly, without making any ado. The fair plotter is pleased at her success, but cannot help imparting to her lady friend, in confidence, her views as to the weakness of the male sex, who can be done so easily. Now, I have no doubt this humorous picture is founded on truth. A gentleman of Epicurean tastes, in taking a trip to Paris, determines to pay a visit or two by himself to the Trois Freres Provençaux, at the Palais Royal, and try all the most *recherché* dishes at that famous restaurant. He has no compunction at all about not having his wife with him, for he knows that she, good soul, will enjoy just as much a dinner of roast mutton and rice pudding with the children while he is away. When Talleyrand had any very puzzling political problem to think of, he always reserved the consideration of it till after dinner, and especially found his brain very fine in its operations after he had partaken of truffles stewed in champagne. Now I venture to say, that the idea of a female Talleyrand is simply absurd.

Another way in which the stronger physical development of the man displays itself is in the love of muscular exertion. This is apparent even in the nursery, where little boys are far more given to climbing, jumping, and other rough sports than are their little sisters. Athletic exercises and out-door sports have always been more or less a passion among men, wherever there has been the least opportunity for indulging in them. Even a life of close confinement and hard work in the heart of a town cannot extinguish this innate feeling; and our lawyers and legislators, our men of fashion and men of business, are found in autumn on the grouse moors, in the deer forests, fishing Norwegian rivers, or scaling Alpine peaks. Those who have seen gentlemen cooped up in a country house, in bad weather, can understand the misery produced by the impossibility of giving free vent to the muscular passion; and the high spirits and hilarity, after a good day's sport, show how great is the pleasure derived from its gratification. Now of this physical craving women have comparatively but little. Most of them can lead lives with a good deal of confinement contentedly enough; and they seem to thrive most when they have a multitude of small activities, which keep them stirring, without much exhaustion. Their physical constitution is, therefore, admirably fitted for the sphere of domestic duties. I have no doubt, also, that, in regard to watching and tending the sick, they are better qualified in body as well as in mind for the task. As men have not that quick compassion, gentleness, and sympathy that women possess, so neither, I imagine, could they so well bear up under the wearing irksomeness of attendance in a sick room.

I have now pretty much exhausted all I had to say on the moral and physical aspects of the feminine character. A very brief notice may suffice of it in relation to the intellect. In the drier studies, woman has certainly never excelled. They do not suit her, either morally or physically. The peculiar type of woman's mind makes her to take a great interest in persons, or in things as connected with persons. Whatever is disconnected from human interest, or only touches it very remotely, has no charm for her. She has, consequently, never been a votary of abstract studies. The general softness also of the bodily structure in woman, I fancy, affects the fibre of the brain, as well as the limbs and muscles. If this be the case, I should suppose the brain is not capable of that protracted, steady, laborious exercise which is required for success in those fields of intellectual exertion. A man requires a firm and hard constitution to lead the life of a scholar, to bear what Shakspeare calls "the burden of lean and wasteful learning;" and we need not wonder if the softer feminine frame is unequal to the task. Hence women have seldom attained any eminence in the drier studies, although in our own day we have one lady, Mrs. Somerville, distinguished for her knowledge of mathematics and the physical sciences. As for a lady who excelled in metaphysics, the world has hardly ever heard of such a phenomenon. The fame of Hypatia rests very much on tradition. She lived in the fourth century, and is said to have taken rank with the first philosophers of her time. And we can name one or two, such as Miss Martineau, whose works have a great deal of masculine force about them. and a firm grasp of political and other principles.

In imaginative literature we should naturally expect women to attain more distinction than in the severer studies. The "dry light," as Bacon calls it, the *lumen siccum,* that is, scientific truth disconnected from human feelings, does not suit them well. But in poetry and fiction, those elements are provided with which they have most sympathy. Accordingly, we do find a considerable number of distinguished names in these walks of literature, most of which belong to rather recent times. In their writings, we see great knowledge of life, observation of character, and artistic skill. As compared with similar productions by men, the works of women abound more in pathos, and shew a deficiency in humour. I think it will, however, be acknowledged, that the dramatic power, which includes conception of character and representation of passion, has not yet reached such a fulness of force in any woman as it has in the great dramatists among men. In no feminine work is there either the intellectual breadth or the passionate depth of the great master-pieces of the art. Nor is it easy to conceive that a woman could ever attain to that comprehensive knowledge of all the phases of human life, nor that penetration into the more fierce and ferocious workings of our nature, which are necessary to the highest tragedy. A woman must preserve first her own proper feminine purity and reserve of character; and the exigencies thus arising seem to preclude her from hoping for the highest place in the dramatic art.

In lyric poetry, such as songs and ballads, women have displayed great aptitude and skill. Many of the sweetest and most exquisite pieces have flowed from their gifted pens, although there is not that concentrated force which marks the works of the stronger singers. Corinna, indeed, won the crown five times from Pindar; but her odes have not remained so as to enable us to compare them with those of the Theban eagle; and perhaps we should not be unjust in supposing, with Pausanius, that her sex and beauty may have biassed the judges in her favour. The most noticeable point in woman's poetry is the prevailing sadness of the tone. This goes the length of being a weakness. The Persian fable tells us that the nightingale's lay is so exquisite, because she leans her bosom on a thorn. And a great bard has said, of all the tuneful brotherhood,

> They learn in suffering what they teach in song.

Certainly this seems to apply with peculiar force to the gifted sisters of the minstrel band, for their sweetest strains ring ever with the burden of sorrow.

In painting, in music, in the fine arts generally, women have accomplished much. A love for beauty seems to be natural to them. Yet that great originality which puts its possessor in the highest place, and which is so very rare a gift, has never yet fallen to their lot. Perhaps we may not err in concluding in general, that, as the strongest physical development belongs to man, so in that sex also are found the fortunate possessors of the largest brain.

This idea is, indeed, most vehemently opposed by John Stuart Mill, in his recent work on the *Subjection of Women.* He thinks that we are not yet in a position to come to any conclusion on the matter. We must allow ages of culture and freedom to be enjoyed by women before we can hope for the appearance of great original power among them; and have no right to predict beforehand that it will never appear. For my own part, without entering into his reasonings at present, I shall only say that I think the world will have every reason to rejoice and be grateful if his views prove true, and it finds itself so much richer than it had hoped to be in the greatest endowments of humanity.

When we turn from literature to the practical affairs of life, I think our opinion of the ability of women will rather rise than fall. We have already remarked, that they cannot take their place openly in the great battle of the world. But they have great influence behind the scenes, and guide those actually engaged in the melée. I have no doubt that many a man has found his wife's advice of the utmost importance in the management of his affairs. She has kept him out of snares, and directed him to successes, by her mind, judgment, and inventive skill. And in what may be termed the social field, as distinguished from the commercial, the ability of women is often very conspicuous. From their natural tendency to occupy themselves much more with persons than with things, they acquire great penetration into character, and can often divine motives and detect secrets with wonderful power and skill. Besides their quickness in reading character, they have a tact in dealing with persons, a skill in contriving plans, and an unshaken resolution in carrying them out, which combination of qualities gives them an astonishing control over those around them. We read in an ancient amusing story, that the master passion in every woman is the desire to rule. This is doubtless a satire on the sex; but there is no doubt that a great many women do display a wonderful talent in ruling, and that not by insisting dictatorially on their wishes being carried out, but by bending circumstances to their aim, and swaying the minds of those they have to do with. Mrs. Oliphant, in a recent work of hers, remarks how kindly women have taken to the task of governing kingdoms; and I think it must be acknowledged that sovereigns such as Semiramis is said to have been of old, and like Catharine of Russia and Elizabeth of England in modern times, are to be classed in the highest rank of monarchs. If women have not reached the first place in art or literature, they have attained it in the line of sovereign power.

Perhaps we may now enquire what views are given us of women in literature or in current sayings; and we may thus have a little further light thrown on our subject. We have first a great deal of poetry, in which woman is made the subject of the highest eulogy.

> Angels are painted fair to look like you,

exclaims one bard; and another replies,

> On man she tried her 'prentice hand,
> And then she made the lasses O.

The whole of love poetry celebrates woman in such rapturous terms that she must be, one would think, hardly short of a divinity. But let us remember, that the lover and the poet, like the madman, "are of imagination all compact." The lover "sees Helen's beauty in a brow of Egypt." Much of love poetry has nothing whatever to do with character, and no lady of refined spirit would look on its amorous strains as being any compliment. Then its purer and nobler praise only proves that women do possess qualities that call forth the admiration and lay hold of the affections of men. But we do not get much to help us in our discriminative task. On the whole, we may draw a conclusion which slightly alters the lesson of an ancient fable. Had lions been the sculptors, groups of statuary would not have uniformly represented the man as conquering the lion; and had women been the poets, love songs would never have ceased to celebrate the beauties, graces, and perfections of men.

In strong contrast to the impassioned and rapturous praises of this kind of poetry, we have those satires levelled against women, in which scorn and hatred appear to have done their worst to dishonour and befoul them. The number of such satires has probably not been small; but woman has had her revenge on her detractors. Very few of these philippics have had a long lease of life. Their bitterness and foulness have made them odious to mankind, and they have soon perished. I have great doubts if a single one of them is ever read, except the one in *Juvenal,* which keeps its place as part of the works of a classic author. I do not know that even he has consulted his own fame in that revolting production of his pen; and though it may in some respects be valuable as a picture of Roman manners, we can hardly think well or kindly of the man who could produce it. Passing from such direct and ferocious attacks, we may observe that a good many cynical sayings are current about women, and a good many foibles are laid to their charge. Most of these have very little in them. We are told that women are very loquacious.

Hear the pretty ladies talk,
  Tittle tattle, tittle tattle;
Like their pattens when they walk,
  Pittle pattle, pittle pattle.

Well, why should they not give free scope to their lively temperament? I think the sound of their talking is rather agreeable, and the house must be a very dull one where you hear neither the chatter of women nor the prattle of children. If any crusty old bachelor has ears which cannot bear these vivacious noises, he ought to be condemned to live in that transatlantic region, where a man, not having seen a woman for twelve years, took a walk of fifty miles to look at one through the window. Then women, we are told, cannot keep a secret. I think the only secrets they cannot keep are those which are made on purpose to be told. I have always found they could keep secrets well enough, of which they felt the importance. Let me remind you, that it was the barber of Midas who disburdened himself of his secret to the water-reeds, so that they proclaimed to the winds that Midas had the ears of an ass. As for that barber in the *Arabian Nights,* whose tongue could never rest for an instant, he must have had, at a moderate calculation, a hundred and forty woman power of talk. And I dare say we have all come across some trousered bipeds to whom the epigram would apply, written on a celebrated statesman.

> Why is a pump like Viscount Castlereagh?
>   Because it is an upright thing of wood,
> Which up and down its awkward arm doth sway,
> And still doth spout and spout alway,
>   In one weak, washy, everlasting flood.

Byron remarks that

> Sweet is revenge, especially to women.

Others tell us, that women have a great deal of cunning about them. Now, I have no doubt that there are particular manifestations of these qualities which are more peculiarly feminine. Cunning is the natural resource of weakness, and women may sometimes compass in that way what men would accomplish by main force. Again, women are naturally jealous of their rivals, and I dare say are not slow to avenge themselves on them. But I think it cannot be maintained that either of these qualities is more largely displayed in women than in men, when we call to mind the frightful stories of revenge we have heard of as perpetrated, especially by certain races, such as the Spaniards or the Malays; or when we think of the pettifoggers, the usurers, the land sharks, and all the many orders of the family of Slyboots, who make this world their prowling-place. Again, curiosity is said to be very strong in women. We have all, I suppose, had this idea very deeply impressed on our minds in childhood by the veracious history of *Bluebeard;* and perhaps we may see a proof of it in the attendance of those ladies who have honoured the reading of this paper with their presence. As curiosity, however, or the enquiring turn of mind, lies at the root of all scientific progress, it is to be hoped that a Philosophical Society like ours will not too rashly condemn a feature of character to which it owes its own existence.

There are two things said about women which I shall mention without giving an opinion on them. One is a remark, frequently made by Thackeray, that they think most highly of those who treat them worst. A bully of a husband gets more esteem and reverence than the kindest of spouses. Now, I am always inclined to believe there must be some truth in whatever Thackeray says. But, whenever I have quoted this opinion of his to a lady, she has always indignantly denied it; and I have had no opportunity of confirming it from my own observation. The other saying is, that women, who once become intemperate, can never be reclaimed from that frightful vice. I must confess I am exceedingly unwilling to believe that this can be true. We know that benevolent enterprises have been most earnestly carried on for reclaiming the fallen; and these surely could have little hope of success if there were so iron a barrier to prevent a return to sobriety. If there be any truth in the statement, I should think the fact arose, not from any inherent deficiency of self-controlling power, of which women often prove they have no small share, but from the peculiarity of the nervous system, which makes the disease of dipsomania take firmer hold. I am glad, however, to learn from our President, that in his ample medical experience, he has had more frequent proof of reformation in female drunkards than in male.

In reference to the vices that women may display, I would just quote the Latin saying—*Optomi corruptio pessima.* The worst corruption of all is the corruption of that which was best. The degradation of woman is in proportion to the grace and loveliness which were originally hers. If one were, however, to follow out enquiries into that not very pleasant, and very far from wholesome, subject, the degration of human character, I am inclined to think that woman never sinks to any level to which man does not accompany her; and that in the lowest deep, he finds for himself a lower deep.

Perhaps there is nothing in literature that aids us so much in forming just and adequate notions of the feminine character, as those delineations which are given us in the works of the great dramatists, and others of kindred genius. No doubt these heroines are imaginary persons, but the characters bestowed on them are drawn from nature. It seems to be a much rarer gift to portray female characters than those of the other sex. Sir Walter Scott has produced many most admirable portraitures of men, but, with one or two exceptions, his heroines are an insipid race. In this, as in other respects, no one else approaches that astonishing genius—

> Who was not of an age, but for all time,
> Within whose circle none could walk but he.

The Shakspearian gallery, besides its crowd of varied figures of the bearded gender, representing every phase of life and style of man, contains also a most admirable group of the sweeter sex; all drawn with the most discriminating touch, full of life and grace, and each one adorned with her own especial attributes. No man probably ever possessed so fine an insight into the depths of the female spirit as did our illustrious countryman. But we may say in general, that the most gifted and sweetest poetic minds have best understood and most appreciated woman's nature. Perhaps one reason is, that the poets have themselves a touch of the feminine character. This is a very different thing, indeed, let us mark, from being effeminate. Effeminacy indicates unmanly weakness, and is a word of blame. But when we say of a man that he has something feminine in him, we mean that he has fine perceptions, quick sensibilities, tender feelings. Perhaps we may mean further, that there is a tendency to cling closely to beloved objects, and a great craving for sympathy and affection. When these things are superadded to truly manly qualities, to comprehensive knowledge, just judgment, and firm will, we obtain a very rich and beautiful style of character, combining the strength of the one sex with the choice graces of the other. In regard to women, on the other hand, the expression "a masculine woman," is by no means one of praise, and indicates coarseness of mind and manners. But the noblest women have always a large endowment of manly qualities. Not otherwise could they come up to the full realisation of what Wordsworth describes, in his exquisite lines referring to his wife, when he speaks of her as possessing

> The reason firm, the temperate will,
> Endurance, foresight, strength, and skill.
> A perfect woman, nobly planned,
> To warn, to comfort, to command.
> And yet a spirit too, and bright
> With something of an angel light.

In the works of more recent years, the question of woman's nature is often touched on; and one poem, by our illustrious laureate, is consecrated to this subject, some of the exquisite passages in which I have quoted in this paper.

Having now passed in review all the various elements constituting character, we may ask whether we have found woman to differ from man in quantity or in quality of character, or in both. That she differs only in quantity, is the idea expressed in these lines from Tennyson's *Locksley Hall.*

Nature made them blinder motions, bounded in a narrower brain;
Woman is the lesser man, and all thy passions, matched with mine,
Are like moonlight unto sunlight, or like water unto wine.

There can be no doubt that woman does differ from man in the mass or amount of what she is gifted with; or, to speak more justly, in the means she possesses for conspicuously developing what is in her. Both in her physical constitution, and in her social position, she finds barriers to the proper outcome of her spirit's powers. But these things should be taken into account in judging of her. The bravest generals could sometimes accomplish nothing, because their forces were too weak. The poor widow who cast into the treasury the two mites, which make one farthing, was declared, by One who could not err, to be far more generous than the rich man who cast in much. And doubtless, in a thousand unknown stories of woman's life, qualities have been manifested in a small and humble sphere, which match the most illustrious displays of human excellence in real worth. And in another sphere of being, when the limitations of this fleshly frame shall cease to imprison the ethereal tenant, it may be found that some of the mightiest and noblest spirits were those which had borne on earth a woman's destiny. I think, however, the conclusion to which our investigations have conducted us, is that the feminine character differs qualitatively from that of man. All the component elements are indeed the same, but in woman they are differently proportioned; and the religious feelings, the kindly affections, the tender sympathies occupy a comparatively larger space. She has less of the self-relying elements, and more of the confiding and self-attachive. She is better adapted for a private than a public life. Her proper place is not in the thoroughfares of the world, but under the shelter of home. Woman is not thus the repetition of man, but the complement to him. Neither man nor woman alone represents the perfect image of humanity; but they must be taken together before we can arrive at the full and true conception. We see in them respectively the two phases of our nature; and find its completeness in their union.

For woman is not undevelopt man,
But diverse. Could we make her as the man,
Sweet Love were slain. His dearest bond is this,
Not like to like, but like in difference.
Yet in the long years liker must they grow:
The man be more of woman, she of man.
He gain in sweetness and in moral height,
Nor lose the wrestling thews that throw the world;
She, mental breadth, nor fail in childward care,
Nor lose the childlike in the larger mind.
Till at the last she set herself to man,
Like perfect music unto noble words.
And so these twain unto the skirts of Time,
Sit side by side, full summed in all their powers,
Dispensing harvest, sowing the To-be,
Self-reverent each, and reverencing each,
Distinct in individualities,
But like each other, even as those who love,
Then comes the statelier Eden back to man.
Then reign the world's great bridals, calm and chaste.
Then spring the crowning race of humankind.

In conclusion, we remark, that the result of woman's life is not to be found in works she herself achieves, but in what she influences others to accomplish. The fruit of her spirit's throes is to be looked for in the life of other spirits. The two great relations in which she puts forth her power, are in regard to the child and to the man. The babe, which lies in her bosom, takes the shape and colour of its little being from what she is herself. The lineaments of the mother's soul are stamped upon the tender substance committed to her charge. How much have some of the greatest and the best of men acknowledged themselves to have owed to a mother's training? How unspeakably affectionate, how tender, how wise, has that training been! What self-sacrifice, what thoughtfulness, what absorbing devotedness have been spent on the beloved task, with no hope nor wish for reward, except in the delight of seeing those little feet tread the ways of Wisdom and of Virtue. In estimating the greatness of woman's work, let us not forget that her spirit has lived and wrought in the noblest workers and the mightiest deeds the world has ever seen.

Alone, I said, from earlier than I know,
Immersed in rich foreshadowings of the world,
I loved the woman. He that doth not lives
A drowning life, besotted in sweet self,
Or pines in sad experience, worse than death.
Or keeps his winged affections clipt with crime.
Yet was there one through whom I loved her. One
Not learnèd, save in gracious household ways;
Not perfect, nay, but full of tender wants.
No angel, but a dearer being, all dipt
In angel instincts, breathing Paradise;
Interpreter between the Gods and men.
Who looked all native to her place, and yet
On tiptoe seemed to touch upon a sphere
Too gross to tread; and all male minds, perforce,
Swayed to her from their orbits as they moved,
And girdled her with music. Happy he,
With such a mother; faith in womankind

Beats with his blood; and faith in all things high
Comes easy to him; and, though he trip and fall,
He shall not blind his soul with clay.

Besides her influence on the child, and the blessed task she thus accomplishes, woman has another great relation to the labourers in earth's field, the warriors in life's battle. This is her relation to the man, whom she brings under the sway of her own peculiar influence. And her proper place is to call out all that is best and purest, most tender and most generous, in his ruder nature. The finest qualities in man are developed under the influence of woman. Her office is, in herself to supply the ideal for which man's spirit hungers; to be herself that pure and lovely thing which can content the aspirations of the manly heart. If not herself the poet, she is to supply the poet with his theme; and in Petrarch's *Laura*, and still more in Dante's *Beatrice*, do we not see how her power penetrates to the inmost, profoundest depths of earth's mightiest spirits? If not herself the hero, she awakens the bosom to heroic aspirations, and nerves it to heroic deeds.

Thy voice is heard through rolling drums,
  That beat to battle where he stands;
Thy face across his fancy comes,
  And gives the battle to his hands.
A moment, while the trumpets blow,
  He sees his brood about thy knee;
The next, like fire he meets the foe,
  And strikes him dead for thine and thee.

In contemplating woman's lot from the point of view we have as men, our feeling is a mingled one. We are moved, perhaps, at once to pity and admire. I cannot think it possible that any man could desire to be under the same rules of destiny. We have a self-asserting instinct which runs in our blood, and seasons the very marrow of our bones. Every man has his ambition. He chooses his field and work, and toils for his reward. And to him it seems a hard and dispiriting thing to be shut out from life's eager contest, and to have no hope of winning its shining prizes. Woman's lot is to love and toil, to hope and strive, in secret, that others may conquer in the fray, may snatch the guerdon and wreathe their brows with the garland of renown. It seems, perhaps, a hard and not to be wished-for destiny. But let us remember, that the noblest lesson humanity has ever learned is that of self sacrifice. To toil, not for ourselves, but that others may be blessed; to be content to suffer and to be forgotten, if so be that some heart is bettered by our sorrow, and some life brightened with a purer lustre; if this be the mark of woman's lot, may we not say that in its best developments it approaches nearest to the perfect glory of humanity's great ideal?

TENTH ORDINARY MEETING.

ROYAL INSTITUTION, 7th March, 1870.

JOHN BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Mr. Thomas Brandon was unanimously elected an Ordinary Member.

The President referred to the recent premature death of Captain Edward Berry, Commander of the ship *Richard Cobden* (the first iron-built ship), and the loss the Society had thereby sustained, Captain Berry having been one of the most active of its Associates.

Captain Berry was a native of Devonshire, and for the last eight years has been an ardent collector for the Museum. During that time he has brought home and presented a considerable number of specimens of birds, fishes, and marine invertebrata. Among the last were two species new to science—one being a beautiful sea urchin, described and figured by Dr. Gray as *Spatangus variegatus,* and the other a large marine annelid, described by Dr. Baird under the name of *Serpentaria Berryi.* Both of these are recorded in the Proceedings of the Zoological Society of London for 1866. Examples of *Sphenopus marsupialis* (a rare species of Zoanthinæ), taken by Captain Berry at Pulo Paya, in the China Seas, are also figured by Dr. Gray, in the Proceedings of the same Society for 1867. In 1868, Captain Berry brought home a large collection of fish from Kurrachee, and in 1869, a smaller collection from the Irrawaddy, which, with other specimens obtained by him, were brought from time to time before the Society. He was proud of the honour of being elected an Associate, and was eager to possess the Society's annual volume of Proceedings. He died in Liverpool on Sunday, the 27th February, 1870.

Mr. Morton, F.G.S., exhibited some interesting specimens of fossil wood and shells, from hæmatite deposits worked in fissures in the Coniston limestone, near Ulverstone. The fossils are clearly of the carboniferous age, and seem to have drifted into the fissures when in a recent condition.

Mr. Higginson exhibited, on behalf of Captain Donald Chisholm, a remarkably fine right upper molar tooth of the Indian elephant. The tooth measured thirteen inches in length and eight inches in depth, showed nineteen lamellæ, weighed sixteen pounds, and had not yet cut the gum, being quite unworn. It was intended by Captain Chisholm as a donation to the Free Museum.

Mr. T. J. Moore exhibited the following specimens from the Free Museum:—A fine specimen of the Sting Ray, or Fire Flaire (*Trygon pastinaca*), taken by a Liverpool fisherman at the entrance of the Mersey in August, 1869. The specimen was remarkable for having two serrated barbs in the tail, as usually there is only one. Two other specimens of this rare fish had been brought to the Museum by Liverpool fishermen within the last year or two. Also a mounted skeleton of Pallas's Snake-lizard (*Pseudopus Pallassii*) of Dalmatia, to show the rudimentary limbs, no indications of which are to be seen externally. Also specimens of *Orbitolites*, and a splendid example of *Cycloclypeus*, rare Foraminiferæ, dredged in sixty fathoms water off Recruit Island, by Dr. Collingwood (as recorded in his *Rambles of a Naturalist on the Shores and Waters of the China Sea*, p. 126). These specimens were lately presented to the Museum by

Dr. Collingwood, together with forty-six skins of birds, two young Megapodes or mound-making birds, the skull of a wild pig *(Sus taivanus)*, two specimens of the largest known Nudibranch *(Doris exanthemata?* of Kelaart), six shells of the genus *Oliva*, and other specimens collected by him in the voyages recorded in his work above mentioned.

A variety of miscellaneous subjects of scientific interest also came under discussion; and Mr. Davies, F.C.S., being asked by a Member if there was any reliance to be placed upon the paragraph in the newspapers concerning the manufacture of butter and other fatty matter out of Thames mud, ridiculed the notion, and said that in all such statements, ninety-five per cent of them were wrong in their chemistry, and the remainder were simply untrue.

Dr. Drysdale then read a long and interesting Paper on the "History of the Theory of the Conservation of Force," which was followed by the usual discussion, after which the Meeting was adjourned.

ELEVENTH ORDINARY MEETING.

Royal Institution, 21st March, 1870.

JOHN BIRKBECK NEVINS, M.D., President, in the Chair.

Messrs. P. B. M'Quie and Edward Edwards were unanimously elected Ordinary Members.

A communication was received from the Council recommending a grant of £5 to the fund now being raised for the family of Professor Sars, of Christiania, who has rendered distinguished services in the cause of science by his researches in marine zoology. The recommendation was adopted, for the first time, on the motion of the Rev. H. H. Higgins, seconded by Mr. Thos. J. Moore.

The Rev. H. H. Higgins exhibited a case of spiders, all of which had been collected in the neighbourhood.

Mr. Alexander Norman Tate then read a Paper "On Scientific Evidence in Courts of Law," which was followed by a lengthened discussion, after which the Meeting was adjourned.

TWELFTH ORDINARY MEETING.

ROYAL INSTITUTION, 4th April, 1870.

JOHN BIRKBECK NEVINS, M.D., PRESIDENT, in the Chair.

Messrs. James Smith, John Waugh, and Hubert Kenion were unanimously elected Ordinary Members.

Mr. T. J. Moore brought before the Meeting the following:—Fine specimens of fossil plants *(Palæopteris Hibernicus, Sagenaria Bailyana, Cyclostigma Kiltorkense, &c.)*, from the upper old red sandstone at Kiltorcan, county Kilkenny, presented to the Free Museum by the Council of the British Association, per Mr. W. Hellier Baily. Life-size drawings of a young specimen of the Lamantin *(Manatus Senegalensis ?)*. These drawings had been carefully made by Mr. J. Chard, Museum Draughtsman, from a specimen recently presented to the Museum by Mr. R. B. N. Walker, Corresponding Member of the Society; also the shoulder blade *(scapula)* of a Greenland (?) whale *(Balæna mysticetus ?)*. This bone, the property of Messrs. Macfie & Sons, had been found while excavating for a foundation under the cellar floor level of some cottage property in Orange Street, in February last. It was evidently part of the cargo of one of the whaling ships which formerly sailed from Liverpool.

The following Paper was then read.

ANCIENT AND MODERN MUGGLETONIANS.

By ALEXANDER GORDON, M.A.

On the evening of the 14th of February last, while the members of this learned society were enjoying the bounties of providence at the Alexandra Hotel, the writer of the following paper was hospitably entertained by the Muggletonians of London, at their chief annual festival. During the week which followed, he was kindly permitted to examine and arrange the curious store of manuscripts in the possession of this singular community. Having thus so recently imbibed from Muggletonian sources, both classical and convivial, he may, perhaps, be allowed to plead the fact as his excuse for once more thrusting the present subject under the notice of the Literary and Philosophical Society of Liverpool.

At the outset it is necessary to state, that the much greater accumulation of materials than was anticipated has compelled the omission of whole sections of the subject. There is no room here for any discussion of the principles of Muggletonian philosophy and theology. This part of the inquiry will, accordingly, be left precisely in the condition in which it was left on a former occasion. It would scarcely be possible to enter satisfactorily into any such discussion, without trespassing into a region marked "dangerous" by a very salutary law of this Society.

Let it be assumed, then, that the Society is in possession of the Six Cardinal Principles of Muggletonianism, viz.,

1. That God and the Man Christ Jesus are synonymous expressions.

2. That the Devil and Human Reason are synonymous expressions.
3. That the Soul dies and rises again with the Body.
4. That Heaven is a place above the Stars.
5. That, at present, Hell is nowhere, but that this Earth, darkened after the last Judgment, will be Hell.
6. That the Angels are the only beings of Pure Reason.

Let it also be assumed that the Society will recollect by what reaction from the pantheistic spirit which Muggleton detected in Jacob Behmen, in the Ranters, and in the Quakers, these Six Principles were evolved and shaped. And now let us proceed to resume the thread of the historical narrative.

The result of further researches has been very much to confirm the impression that the main interest of Muggletonian history, both theological and biographical, is to be found at its outset, and is concentrated in the personal career of the honest London tailor, whose name is identified with the system which his cousin Reeve claimed to have received by immediate revelation from heaven.

We have traced already the early history of these two men, and brought them to the point of their joint appearance in the world of London as prophets of the Lord, "Witnesses of the Spirit," as they most commonly call themselves. This was in the spring of 1652. In the ferment of conflicting religious opinions which then agitated the mind of London, the new prophets were sure of a hearing, at least for a time. The crowd that had listened to John Robins, and wondered at Thomas Tany, quickly gathered round Reeve and Muggleton. "There came," says the latter, "a many people to discourse with us, and asked questions about many things in matters of religion, and we answered them to all questions whatsoever could arise out of the heart of men. Some few were satisfied and believed; and many despised."*

To place their position in a more definite form before their admirers, John Reeve, assisted by his cousin, wrote an account of his illumination, and of the leading principles of his doctrine, which he termed *A transcendent Spirituall Treatise.* It was printed, but not published, for fear of the ordinance against blasphemy; indeed it would have been impossible to obtain a license for its publication. The crowded title-page bears upon its face, among other matters, this advertisement — "If any of the Elect desire to speak with us concerning anything written in this Treatise, they may heare of us in Great Trinity Lane, at a Chandlers shop against one Mr. *Millis,* a brown Baker, neer the lower end of Bowlane." The address here given is that of Muggleton's private residence. This work is usually referred to by the title of the *Commission Book,* and is regarded as containing the credentials of the writers. On the truth of its statements they base their authority. "Many people," we are told, "were more offended at the doctrine therein, than at the Commission"† itself, *i. e.,* at the power of declaring men saved or damned according to their faith. It was not to be supposed, considering the temper of those days, that the two Commissioners should be allowed to proceed on their way without some annoyance and persecution. Persons who had been "sentenced," hooted after John Reeve in the streets, "There goes the Prophet that damns people!" Little boys pursued him through Paul's Churchyard with the cry "Prophet! Prophet!" and threw gravel and stones at him, till he took refuge within the sacred walls. One Mrs. Turner, whose husband it seems was willing to go with the Prophet, being "exceeding wroth, and fearful that her husband would be brought into trouble by it, said, if John Reeve came again to her husband, that she would run a spit in his guts." A certain Mr. Penson, in the course of a discussion with Lodowicke Muggleton, broke out at length, "'Wilt thou say I am damned to eternity?' 'Yea,' said I, 'thou art.' Then he rose up, and with both his fists smote upon my head."*

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* *Acts of the Witnesses of the Spirit,* 2nd edition, 1764, p. 48.

† *Ibid.,* p. 49.

These were minor vexations. The serious troubles of the Witnesses did not begin till their enemies contrived to bring them within reach of the law. At first it seemed difficult to do so. As Lodowicke Muggleton sagaciously observed, on more than one occasion, "they could not tell what to do in it, seeing there was no law against any man for saying a man is damned."† A charge of witchcraft was suggested, but nothing came of it. And meanwhile the two cousins were making converts, and converts of some position. Among these were one Jeremiah Mount, a young gentleman of means (of whom one would like to know more—there are some letters of his in the Public Record Office which seem to imply that he got into political trouble in 1663); Captain Clark, a friend of Mount's; Captain Stasy, in the Parliamentary service; and Richard Leader, a rich New England merchant, "and a great traveller into many parts of the world; he was a religious man, but had somewhat declined the outward forms of worship, because he could find no rest there; so he applied his heart more to philosophy and the knowledge of nature than religion, for he thought he had seen the utmost of religion, and that there was nothing in it."‡

At length, in September 1653, a clergyman named Goslin, a "Cambridge scholar," as he is termed, an exciseman named Ebb, a shopkeeper named Chandler, and two soldiers whose names are not given, having procured a copy of the *Transcendent Spiritual Treatise*, and being armed with other evidence, joined together to obtain a warrant against Reeve and Muggleton, in the Lord Mayor's court, on a charge of blasphemy in denying the Holy Trinity. After a month's durance in Newgate Jail, they were brought to trial, before the Lord Mayor, Sir John Fowke, found guilty, and committed to the Old Bridewell for a term of six months. They give but a doleful account of their prison fare. Of Newgate, for example, they say, "the boards were our bed, we had no sheets, only a poor flock bed upon the ground, and one thin blanket at top; and we paid seven groats a-week for this lodging, and thought ourselves very well used in a prison, which thing we were never acquainted with before. But we were more perplexed with the prisoners within than with the imprisonment itself." A very ludicrous and graphic account is given of violence and mischief which prevailed within Newgate walls. When Muggleton went to the gates to speak with any, the boys would snatch off his hat, and "pawn it for half a dozen of drink." Three wild highwaymen actually tried to hang poor John Reeve, with a rope tied to the beam of his cell. Nor was their importunity much more reasonable than their malice; one poor prisoner, when he got very drunk, would kneel down on his knees and say, "For Jesus Christ's sake, John Reeve, bless me, for I am a wicked sinner." Nothing like order was maintained in this miserable hateful den till the keeper employed "four condemned and convicted men" to act as underkeepers, and to help him to "shut up the prisoners every night."* In spite of the ill-treatment they suffered, our friends did not lie idle in their prison: they wrote and printed Letters and Remonstrances, addressed to the Lord General Cromwell, to the Lord Mayor, and to the clergy in and about London. After leaving Bridewell, in April 1654, John Reeve composed "that spiritual and heavenly treatise, entitled *A Divine Looking-glass,* and he got it printed in the year 1656. Jeremiah Mount was at the greatest part of that charge. But the printer, being knavish and covetous, quite spoiled it in the press; he huddled it up so close together, for want of more paper, that nobody had any delight to read it through; so that it never yielded the money it cost printing."*

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* *Acts of the Witnesses*, *ut supra*, pp. 49, 43, 50.

† *Ibid.*, p. 85. ‡ *Ibid.*, p. 58.

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* *Acts of the Witnesses, ut supra*, pp. 73, 75.

This was nearly John Reeve's last work. His life had a plaintive close. He went to pay a visit in 1656 to some friends at Maidstone; but here, in consequence of his passing sentence of damnation on certain persons who despised his Commission, they got a constable to apprehend him; but having timely notice of it he left in haste, and "overheated his blood with travelling to the water side, which was sixteen miles, and he went upon the water at Gravesend when he was all in a sweat, and cooled himself too soon. So he surfeited his blood, and drove him into a consumption, which killed him. He lived almost two years afterwards, but in a sick, wasting condition."† Some of his letters, written at this time, contain touching references to his poverty and ill-health. Unable to work at his trade, he was dependent on the contributions of his friends, who, he complains, "make no enquiry after me, whether I am dead or alive. I still continue very sick and weak, so that of necessity I must either mend or end in a little space."‡ His wife was also an ailing creature, and died before him, on the 29th March 1656.§ When she was gone, he had his dwelling with three sisters, Mrs. Frances, Mrs. Roberts, and Mrs. Boner, who kept a sempstress' shop in Bishopsgate Street, near Hog-lane End; and in their house he died, "about the latter end of July 1658, in the seventh year of the Commission, and in the forty-ninth year of his life."* He was interred in Bethlehem Churchyard, an extinct burying ground, the site of which is to be looked for in Liverpool Street, opposite the Broad Street Station of the North London Railway.

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* *Acts of the Witnesses, ut supra,* p. 78.

† *Ibid.,* p. 79.

‡ *Supplement to the Book of Letters,* 1831 pp. 1, 2.

§ This date, 1656, may be strongly suspected to be an error, and should doubtless be corrected to 1658. Reeve had a daughter, for we are told (*Sp. Ep.,*

His health probably never had been robust, and this gave a plaintive tone to his religion, very different, even on points in which their opinions altogether coincided, from the vigorous self-assertive spirit of his coadjutor and cousin. A remarkable illustration of this divergence of temper, or rather of nature, may be formed by comparing the relations they severally held to a distinguished religious writer of their time, with whom each came into controversy at different periods. John Reeve had seen and read a volume entitled *Divine Essays*, written in 1654 by Isaac Penington, the younger, before he joined the Society of Friends. He entered into correspondence with Penington in 1658, on the subject of this book, and addressed an Epistle to the Earl of Pembroke on the same topic. Reeve's language throughout is modest, tender, anxious, and conciliatory; to Penington he says, "though this everlasting Light have not clearly manifested itself in thy soul at present; yet because thou mayest enjoy it in due time when the Holy Spirit presents the super-excellency of it unto thy spirit, therefore suffer me to write a little of the effects of it in my own soul;" and to the Earl of Pembroke he writes, "I would not willingly wear out your patience with superfluity of words: Oh! bear with me a

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p. 114) that "John Reeve's wife and his daughter did get most part of his living. One Ann Adams, who afterwards married William Cakebread of Orwell, is spoken of as 'his handmaid to guide him to friends' houses.'" (*Ibid.*, p. 530.)

* *Acts of the Witnesses, ut supra*, p. 80.

little, I humbly beseech you, and conceive it to be from the love of the Divine Voice of God himself, our Lord Jesus Christ, in sending me unto you and all of your sweet and tender spirit."*

Many years after, in 1668, Isaac Penington, who had by this time been nearly twenty years a member of the Society of Friends, published *Observations on some Passages of Lodowick Muggleton,* a pamphlet to which Muggleton replied, in an *Answer to Isaac Pennington, Esq.*, couched in an exactly opposite style to that which Reeve had adopted. "I do remember," he says, "several letters of yours to John Reeve, and of his unto you; some are yet to be seen; and this I say, your language was then very high, only it was groundless; and I suppose you had no faith in what you writ yourself; if you had, sure you would not have left that high language, and have fallen to the silly Quakers' principles, where there is neither head nor foot, bottom nor top." His criticism of Penington's *Observations* is full of asperity, and he presents his own doctrine in its severest and hardest form, so that one is quite prepared to find the *Answer* closing with the sentence of damnation. He adds (and doubtless with truth), "I give not judgment on you out of any malice or hatred, but had rather you had been quiet and still, as you have been many years, since you wrote to John Reeve; if you had not written to me against me and my revelation, I should have let you alone, for I never did judge any man or woman till they did judge me first." Yet Penington's tone was so far from being harsh, that he had expressly said, at the close of his *Observations,* "Now as for him (notwithstanding all he hath done against the Lord, and against his people), so far am I from wishing any harm unto him, that I could wish with all my heart that it were possible for him to come to a true sense of the true light of God's Holy Spirit." It is very characteristic of the two Witnesses, that Reeve met and accosted such a man with a pleading persuasion, whereas Muggleton strode over him with an imperious dogmatism.

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* *Sacred Remains,* 2nd Edition, 1752, pp. 44, 51.

Notwithstanding his sickness, John Reeve had written, in his last hours, a book called *Joyful News from Heaven*, or *The Soul's Mortality proved*—strange work, it may be thought, for the deathbed of a man who was certainly religious. By mortality, however, as applied to the soul, Reeve was far from intending absolute extinction without possibility of revival; he meant what has sometimes been called the sleep of the soul. He held that soul and body perish together, and will, at the end of time, together rise; a doctrine entertained apparently by some of the Early Fathers of the Church; a doctrine at any rate by no means uncommon in this country; for, not to speak of such heretical communities as the Soulsleepers in the seventeenth century, the Unitarians of the school of Priestley in the eighteenth, and the Freethinking Christians in the nineteenth,* or such wayward thinkers as Richard Overton, Henry Layton, and William Coward, M.D., it may be sufficient to point out as advocates of the doctrine the well known names of John Milton, Thomas Hobbes, Henry Dodwell, Archdeacon Blackburne, Edmund Law, Bishop of Carlisle, and the late Bishop Hampden, of Hereford. Nay, it is not without significance, that of the original Forty-two Articles of Religion, published by royal proclamation in 1552, Article XL., against those who said "that the souls of such as depart hence do sleep, being without all sense, feeling or perceiving, until the day of judgment; or affirm that the souls die with their bodies, and at the last day shall be raised up with the same," was expunged by Convocation in 1562, which thus refused to condemn the opinion.

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* A small Scotch sect, called the Christadelphians, or Brethren of Christ, who have a meeting-place in Edinburgh, hold this view.

Reeve spoke of this doctrine by the name of the mortality of the soul; an appellation which *primâ facie* gives a false impression. He might almost as reasonably have called it the immortality of the body; since what he actually believed was that soul and body are found only in union, and disappear and reappear together. Of their reappearance he had no manner of doubt, though, strictly speaking, the body that rises is not the identical body that dies. When the death-sleep is over, "the soul quickens," and a spiritual body arises, shaped like the first. On awaking, death will seem but the sleep of a quarter of an hour, or the interval of a moment.

After John Reeve was dead, Lodowicke Muggleton had a clear field for the assertion of his own undivided claim to the prophetic function, and he was not slow to make use of it. It is curious to notice how, even during their joint lives, the more powerful nature of Lodowicke had gained its own way in the shaping of the system which Reeve's Commission had originated.* "You say," he writes to Walter Buchanan, in 1671, "I contradict John Reeve. To this I say I have power to do so, and I had power so to do when he was alive, and did contradict him in something when he was alive; and John Reeve wrote somewhat that was error to me, and error in itself, which I did oppose him in to his face, and he could not deny it. And yet, notwithstanding, John Reeve was infallible, and did write by an unerring spirit. This will seem a riddle, except it be unfolded thus. As to the doctrinal part contained in our writings, the Six Principles were written by an unerring infallible spirit in John Reeve, and the interpretation of Scripture written by him was infallible; but John Reeve's experience and apprehension of God's taking immediate notice of every man was an error . . . as I did prove to his face."*

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* Penn asserts (*New Witnesses*, p. 62), that Muggleton told him he thought Reeve "hot brained and distempered in his head."

This difference of opinion, in which Reeve gave way to Muggleton, was a singular result of their strange boldness in conceiving of God as strictly humaniform, even as to shape and size. Said Reeve, in his epistle to the Earl of Pembroke, "The Creator is no such vast bodiless spirit as you have described him to be . . . he is a glorified body of flesh and bone in the likeness of a man; and the compass and substance of his glorious substance is no bigger than a man is, and the essence of it is but in one place at once. Only take notice of this, that his little eyes are so transcendently bright and glorious, that at one look or view they pierce through heaven and earth, angels and men; and at once, or one word speaking through his heavenly mouth, it entereth (if it be his pleasure) into all the spirits of men or angels."* Reeve therefore held, in a form appropriate to his peculiar theology, the common doctrine that God exercises an immediate oversight on all human actions. Muggleton, on the other hand, affirmed that God takes notice of human actions only in virtue of "his law, written in every man's heart, both saint and devil, and no otherwise." Further, he affirms that "whoever doth not act well, by that law written in his heart, and doth not stand in awe of that, and fear to offend that law of conscience as if God himself did stand by, all his well-doing is but eye-service, and respected of God no more than the cutting off a dog's neck." "Neither," he adds, "do I refrain from evil for fear of God's Person seeing me, and because he seeing me will punish me; but I refrain from evil because the law written in my heart seeth all my doings, so that God need not trouble himself to watch over every man's actions himself, for he hath placed his Law a watchman in every man and woman, to give notice of all their doings, whether good or evil."* Reeve unreservedly deferred to his cousin's judgment on this point, yet it must, I imagine, have gone severely against the grain with him.

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* *Stream from the Tree of Life*, 1758, p. 13.

* *Sacred Remains*, *ut supra*, p. 56.

The doctrine that God takes no immediate notice has proved a test of othodoxy and a fertile source of division among the Muggletonians from that time to this. It has created that which forms the greatest outward distinction between them and other sects—the entire abandonment of prayer as a spiritual access to God; and indeed the abolition of formal worship of any kind. Reeve himself was by no means disposed in all cases to charge the practice of prayer with weakness or profanity. "I do not," he says, "in the least deny the use of the tongue in prayer, and praises also, so that a man be undoubtedly moved thereto by the true light of the righteous Judge of quick and dead; but glittering words, flowing from natural parts only, in merciless men, are an abomination to our God and his tender love in our new-born people."† Indeed there are on record some short prayers of his, and of Muggleton's too, dispersed through their works. Nor was there in the first instance any injunction laid upon Muggletonians to abstain from frequenting the usual places of public worship. "I never did," says Muggleton, "forbid any believer of this Commission of the Spirit to go to church; neither did John Reeve in his time; they all went to church, or to meetings. But [in his *Interpretation of the Book of Revelations*, 1665,] I had occasion to write concerning worship, and, the believers reading it, their eyes were opened to see it was idolatry to worship as the nation doth, so that many of them refrained from it. Some could not refrain because of persecution; but those that did refrain had much peace in themselves, and were better beloved with me than the other; they that did go to worship had shame and trouble and doubting in themselves, and I let them bear their sin and never reproved them for it."* At the present day strict principle induces Muggletonians to forego any attendance upon public worship, even at such occasional services as a funeral or a marriage. And in the few isolated instances in which Muggletonians indulge in the private use of prayer, the habit is regarded by their fellow believers as an inconsistent eccentricity, the sign of an immature, and so far imperfect faith.

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* *Stream from the Tree of Life*, *ut supra*, pp. 2, 3.

† *Sacred Remains*, *ut supra*, p. 46.

It is odd enough, therefore, to find a caustic and amusing writer, one of whose clever books has just been reproduced, selecting the Muggletonians as extreme advocates of an exactly opposite opinion, viz., the doctrine of a particular providence. Somewhat clumsily says the *Tin Trumpet*: "Fanatics, whose inordinate conceit prompts them to believe that the Deity must be more engrossed with the affairs of an obscure Muggletonian in Ebenezer Alley, Shoreditch, than with the general and immutable laws of the universe, presumptuously wrest every unexpected occurrence in which themselves are concerned into a particular Providence, more especially if it be an escape from any kind of danger." And again: "Even a Muggletonian would hesitate at calling this a providential intoxication." Yet a third time: "We submit this accident to the joint and serious consideration of the Muggletonians and Phrenologists."†

Though Muggleton managed to secure his own way in the community of which he was now the sole head, it was not without opposition that he did so. His first rival arose very shortly after John Reeve's death.

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* *Acts of the Witnesses*, *ut supra*, p. 147.

† *The Tin Trumpet*, published 1836, republished 1869, pp. 7, 8. Horace Smith evidently makes use of the name in entire ignorance of its history, simply for its odd sound; just as Douglas Jerrold in *Nell Gwynne, or the Prologue* (1833), makes Mrs. Snowdrop say—"Nothing now will serve her but to go upon the stage. 'Tis n't my fault; I'm sure I put the pious Mr. Muggleton under her pillow every night."

At the beginning of February, 1658, the Rev. LAURENCE CLAXTON appeared in London. This Laurence Claxton describes himself as a beneficed clergyman of the Church of England, holding a small living of £100 per annum. He was now forty years of age, and had a family of five children dependent on him. Although a parish priest, he seems to have been one of that numerous class who in those days were on the look out for a religion, Seekers or Waiters, as they modestly called themselves. He had been attracted by the pantheistic teaching of the Ranters, and was in the habit of preaching in this strain himself. He came to London, because he had been informed that the two Witnesses, mentioned in Revelations xi., were now to be seen and spoken with; and he was anxious to hear what they could say for themselves. John Reeve lent him one of his books; and this made a deep impression on him. "For the space of three weeks," he says, "I could not be at quiet, sleeping nor waking, going nor riding." He decided at last, after much painful uncertainty, that he must quit his "trade of preaching," resign his benefice, and trust to providence for a livelihood for himself and his little ones. At the instant when he had formed this decision these words came into his thoughts — "Remember me, how here, in this world where now thou livest, I was a poor despised Saviour, though now a rich immortal God; and therefore take no care, I will provide for thee and thine." At the same time, he adds, the Lord freely forgave him all that was past, present, and to come.*

Henceforth Claxton thoroughly threw in his lot with the fortunes of the Muggletonians. After John Reeve's death he asked leave to write in vindication and justification of the Commission of the Spirit. Muggleton gave his consent, and he accordingly wrote four books, one after another, which had a great run among his friends of the Commission, and succeeded in gaining many adherents to the cause he had at heart. Of these books the present writer has seen three in print and one in manuscript. They are written with some power, and, as one might expect, with more polish than was at the command of his associates. What seems specially to have attracted his imagination, and principally engaged his pen was the Muggletonian doctrine of the Devil, as being no invisible malign agent, but, since the fall of Eve, existing only as the unclean Reason in Man. He is merry on the applications of this doctrine. Derisively alluding to the popular portrait of a hoofed and horned King of Darkness, —the only "devil," says he, "that ever was, is, or shall be, is for the most part as comely a creature as walks in London streets; and hath as neat a foot and a hand as any lady in the land!"* And the title of the first book he wrote was, *Look about you, for the Devil that you fear is in you.*

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* See *Introductory Epistle* to *The Right Devil Discovered*, &c., by Laur. Claxton, 1659.

Claxton might have continued to render great service to Muggleton, had not his confidence in his own abilities proved fatal to his submissively working under his chief. "He grew so proud as to say that nobody could write in the vindication of this Commission, now that John Reeve was dead, but he; and to that purpose he wrote another book, intituled "*The Lost Sheep Found*, 1660."* When Muggleton read this book, at the instance of several believers who complained of Claxton's lording it over them in it, he discovered that his new assistant was exalting himself as the only true Bishop (note the recovered accent of the priest, the only true Bishop) and faithful messenger of Jesus Christ; and that he was describing Muggleton as merely John Reeve's mouthpiece and no more. Whereupon Muggleton at once and for ever interdicted Laurence Claxton from writing in defence of the Commission. This was in 1660.† For a year Claxton stood out in opposition; but obtaining no followers, and finding Muggleton's power too strong for him, he humbled himself and acknowledged his fault. Muggleton accordingly forgave him, and took him again into his favour; cautiously tying him down, however, to write no more. His end is thus narrated, by the man whom he had vainly opposed. "It came to pass, when the fire destroyed the city of London, he, to get a livelihood, did engage to help persons of quality to borrow money, to build their houses again. But the persons that had the money did run away, and left Claxton in the lurch; the debt was £100. So he was arrested and put in Ludgate Gaol for this money. He lay there a whole year, and died there. But he gave a very good testimony of his faith in the true God, and in this Commission of the Spirit, and of that full assurance of eternal happiness he should enjoy to eternity."‡

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* *Right Devil*, *ut supra*, p. 22. Compare the following question and answer from Fielding's *Eurydice* (1735):

"*Mr. Spindle.* Well, but what sort of a fellow is the old gentleman, the devil, hey?

"*Capt. Weazle.* Is he? Why, a very pretty sort of a gentleman, a very fine gentleman; but, my dear, you have seen him five hundred times already. The moment I saw him here, I remembered to have seen him shuffle cards at White's and George's, to have met him often on the Exchange, and in the Alley, and never missed him in or about Westminster Hall. I will introduce you to him."

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* Sir Walter Scott had seen this *Lost Sheep*, which the present writer has not yet found. He treats it, however, as the production of a Familist; evidently confusing the Muggletonians with the Grindletonians, an earlier sect. See Note E. to Woodstock.

† Muggleton spoke of Claxton as a Gehazi, and attributes his change of tone in part to his having "consulted with that venomous serpent," his wife, Frances, who seems never to have shared her husband's belief in the Witnesses, and had been sentenced by John Reeve. Muggleton bade the believers in Maidstone allow Claxton "no more maintenance weekly, as you have done formerly;" still he continued to recommend his earlier writings, and furnished them to believers as late as 1684.

‡ *Acts of the Witnesses*, *ut supra*, p. 82.

Matters went on pretty smoothly with our Prophet for about ten years after Claxton's recantation. He wrote books, disputed with all comers, paid visits to his friends in various parts of the country. Among other places, he visited Nottingham in 1663, at the expense of a "Society of Behmenists, mixed with Quakers," who invited him thither at the instance of his friend Ellen Sudbury, wife of Richard Sudbury, an ironmonger of Nottingham. It was on one of his journeys that he got into difficulties at Chesterfield, where his valued friend and correspondent, Mrs. Dorothy Carter, a widow, and the aunt of Ellen Sudbury, kept a small school. He was apprehended and committed to Derby Gaol, at the instance of the Rev. John Coope, the vicar of Chesterfield, on the old charge of denying the Holy Trinity. The horse on which he rode was also seized on behalf of the Lord of the Manor, and he was more troubled for the horse than for himself, "because his friend, John Brunt, was surety for the horse, else pay four pounds." The Earl of Newcastle, however, who was Lord of the Manor, on hearing of the circumstances, "was angry," and said, "Will you take away a man's horse before he be convicted and condemned? I charge you," said he, "that the horse be put to grass, and let the owner pay for his meat." Coope, the prosecutor, was surprised at the sense and courage which Muggleton displayed on examination; and said to the aldermen, when the prisoner was removed, "that this man was the soberest, wisest man of a fanatic that ever he talked with;" he had fancied him a sort of Quaker. However, Muggleton lay in Derby Gaol nine days, and then was released on bail to meet his trial at the next assizes. Probably then the prosecution was allowed to drop, for he complains of nothing except the nine days' imprisonment and the fees of the prison, and the grief which his detention caused to his newly married wife.

This imprisonment in Derby Gaol is worth noting, inasmuch as it was the occasion of an interview between Lodowicke Muggleton and that same Gervase Bennet (or Benet) whose sarcasm gave rise to the fixing of the name "Quakers" upon the "Society of Friends of Truth," or followers of George Fox. It does not appear that we have any other account of Judge Bennet which gives any insight into the character of the man. Muggleton describes him as "more atheistical" than his brother magistrates, "being of the Sadducee spirit," and says that on his wisdom and knowledge they all depended. He speaks of him too as "a moderate man, who asked his questions moderately." For four hours they talked together on points of theology. They had agreed to refer the topics of their discussion to the arbitrament of Holy Scripture, in the handling of which Muggleton showed his wonted shrewdness. Bennet was nonplused, to the great delight of the magistrates, the sheriff's men, and the jailor, who were present at the interview, and rejoiced in the defeat of one who had so often vanquished them in argument. They could not restrain their glee, but frequently interrupted the colloquy. "Mr. Bennet, we think you have met with one that is too hard for you now!" "Now, Mr. Bennet, you have met with your match!" Bennet showed great good humour in the disputation; he evidently was very much taken with his stout opponent, and acknowledged that he approved of what Muggleton had spoken better than of anything that ever he heard in his life, and could not gainsay it; but said, moreover, he could not venture his salvation on any man's words. On one point they were agreed, to begin with. Bennet had "been a long time of the opinion that the soul of man is mortal, and doth die."* This picture of the man, candid, materialistic, literal, fond of disputation, and of all things abhorring fanaticism, answers exactly to the character which Fox's *Journal* leads us to form of him, and supplies an interesting historical confirmation of its truth.

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* *Acts of the Witnesses, ut supra*, pp. 93–102.

Earlier in the same year in which he suffered imprisonment at Derby, Muggleton had married for the third time. His wife, Mary Martin, was the daughter of John Martin, a tanner, at East Malling, in Kent. "I had been," says he, "a widower sixteen years before I took this maid to wife; she was twenty-five years of age when I married her, and I was about fifty-three years old when I took her to wife. She was of a good, meek, innocent and just nature, besides the strong faith and zeal she had in this Commission of the Spirit; so that she was very suitable, both in spiritual and temporal qualifications, unto my nature."* Indeed this last marriage of his seems to have been a very happy one. His wife brought him a little property, and devoted herself to his interests till the day of his death; often by her quickness of wit standing between him and danger; and tending his latter years with the most patient care. She survived him twenty years.

Derby Gaol was not the last prison into which Muggleton found his way. His books were seized in London in 1670; but he escaped the malice of his persecutors, and remained in hiding for a time. Nor would he have appeared again, probably, in a court of law, had not the death, in 1675, of a well-to-do friend of his, Deborah Brunt, widow of John Brunt (one of the first believers, and a good friend to the Witnesses during their imprisonment in 1653), left him in the position of her executor. He brought an action of trespass against Sir John James, in respect of some house property, formerly belonging to Mrs. Brunt, in the Postern,

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* *Ibid.*, p. 86. The marriage took place in 1663, at some time previous to 14th Nov. 1663. (See Letter to Dorothy Carter, of that date.) It was solemnised "according to the law of England." It is presumed that it did not take place at Church, as no entry of it is to be heard of in any likely Parish Register.

London Wall. This led to a lawsuit, in the course of which he was obliged to make his appearance in the Spiritual Court, only to be once more apprehended on the charge of blasphemy.

This was at the lowest ebb of his fortunes. For, during his enforced absence from home, certain of his followers had revolted; and, under four notable ringleaders (a scrivener, a flaxman, a brewer, and—what Muggleton hated of all things—a Scotchman), had declared that Nine Assertions made by the prophet, which they specified in writing, were contrary both to common sense and to the principles of John Reeve. The Assertions are certainly strong enough; however, Muggleton defended them through thick and thin. As to common sense, what was that but reason; and reason was the Devil. And as to John Reeve, why faith in a living prophet's word was surely better than quotation of a dead one's writing.

It showed the power of the man's character that, although circumstances forbade him to meet the rebels openly, yet his denunciation of them by letter was enough to put an end to the division. The four leaders were expelled; one only of them being allowed afterwards to return to the fold. As for the Scotchman, Walter Buchanan, he received his sentence of damnation, expressed in language which was sufficiently warm. "You have showed yourself a right Scotchman, a dissembling, false-hearted man, of the Scottish nature. And it would be a rare thing to meet with a true-hearted Scotchman or woman, that is upright in heart either to God or man; for I have been in this Commission almost twenty years, and I never knew but two, a Scotchman and a Scotchwoman, that made a profession of this faith; and they both proved false-hearted both to God and man."*

However, the internal conflict among his followers must have added greatly to the bitterness of a persecution, which in itself was sufficiently severe. After long delay, Muggleton was tried, before judges Atkins and Rainsford, at the Old Bailey, on Wednesday, the 17th January, 1677. Sir Robert Atkins was lenient to him on the trial; but Sir Richard Rainsford, Chief Justice of the King's Bench (who had recently succeeded Sir Matthew Hale), pelted him with gross abuse from the bench; and when it is added that sentence was given by the notorious George Jefferies, then Recorder of London, it may be presumed that it did not err on the side of leniency.

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* *Stream from the Tree of Life*, *ut supra*, p. 10.

The trial can hardly be termed a fair one. The evidence against him was indeed derived from his own books, which had been seized at his house by the wardens of the Stationers' Company.* Still there was some difficulty in shaping the case so as to procure a verdict against him; because anything not published within the last three years came within the Act of Indemnity of 1674; and Muggleton had sent nothing to the press since 1669. Unfortunately, however, to evade the difficulty of publishing a heretical book in England, he had formerly allowed one of his books against the Quakers to appear with the imprint "Amsterdam, printed in the year of our Lord God 1663, and are to be had in Great Trinity Lane, over against the Lyon and the Lamb." The "Amsterdam" was palpably a ruse;† might not the volume have also been antedated, so as to put it under the protection of the Act? This was the argument adopted by his prosecutors, and it was successful. The indictment set forth that "he, the said Lodowicke Muggleton, on the 30th of August, in the 23rd year of His Majesty's reign, in St. Giles' Parish without Cripplegate, London, by force and arms, did unlawfully, wickedly, maliciously, scandalously, blasphemously, seditiously, schismatically, and heretically, write, print, and sell, utter and publish, a certain malicious, scandalous, blasphemous, seditious, and heretical book, entitled *The Neck of the Quakers Broken.*" Being found guilty, he was condemned to pay a fine of £500, and to stand upon the pillory in three of the most eminent places of the city, the Exchange, Temple Bar, and Smithfield, on three several days; his books to be burned with fire before his face. The pillory he accordingly suffered, and was much knocked about in it, "his grey hairs gilded with dirt and rotten eggs," according to a contemporary account. The fine he could not pay, and was accordingly sent to prison; but having remained there six months, he was released after paying £100, and finding two sureties for his good behaviour during life, on the 19th July, 1677; a day of joy to his people, and a red letter day in their calendar.

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* Some of the actual books seized are still extant. One is in the Lambeth Library, and bears on the back of the title the inscription, "Aug: 30th, 1676. Seazed att Muggleton's house in the Posterne by Samuel Marne & Richard Clarke, Wardens." Another is in St. Paul's Library, and has on the fly leaf the words "30th August, 1676. Seized at Lodowick Muggleton's house by Samll. Mearne & Richard Clark, Wardens." This copy belonged to Bishop Compton, and was presented to St. Paul's Library, with the rest of the Bishop's benefaction, in July, 1715.

† It was not an uncommon evasion. For instance, the first edition of Richard Overton's *Man's Mortalitie* bears the imprint, "Amsterdam, Printed by John Canne, Anno Dom. 1644."

If any one were anxious to vindicate the salutary effect of persecution, as a means of keeping obstinate people in order, he might fairly refer us to the case of Lodowicke Muggleton, as an instance in point. There can be no doubt that the Last Witness was cowed by his appearance in the pillory. He was an old man, or at least not a young one, being sixty-eight years of age, and though he survived his rough usage twenty years, it deserves remark that he never again ventured, at all events in writing, to pass the merciless sentence of damnation upon an opponent. Certainly this is a very significant fact. He had learned a lesson. No more for him of "the modest punishment of a wooden ruff." He was not willing to expose himself again to the jeers and violence of the mob. They had spilled his blood, and it would cry out in vengeance against them, he said; but for all that, he took care not to come in the way of the authorities again. With this event therefore his public life ends; henceforth we know him only in his correspondence, which forms a large collection. He wrote his autobiography for posthumous publication, bringing it up to the date of his release from prison; and nothing shows more plainly how the degradation of his cruel punishment had eaten into his soul, than the awful denunciations against judges, jury, wardens, lawyers,—in short, against all who had taken part in his prosecution,—which fill the later pages of his autobiography. The terrible vehemence 'and deep searching thirst for vengeance' of his complaint and supplication to God against his enemies is so real and vivid as to make one shudder.

It would appear that he lived hereafter a quiet easy life; dispensing his blessings to his followers; joining in their social meetings; twice a-year commemorating the two great events of the giving of the Commission to John Reeve in February 1652, and his own release from custody, in July 1677; looked up to as an unerring oracle in things spiritual, an excellent guide and adviser in things temporal too. In his later letters, a large space is taken up with counsel and suggestion on matters of this material kind. It is difficult to resist the temptation of extracting one of these, unique in its kind, which, as a study of character, is simply delicious.

A Copy of a Letter written by the Prophet Lodowicke Muggleton to the Widow Mrs. Elizabeth Marsden, [formerly Elizabeth Smith, and servant to Dorothy Carter,] *of Chesterfield, bearing date from London, April* 18*th*, 1685.

"Dear friend in the true faith, Elizabeth Marsden.

Having an opportunity at this time to inform you, that there is a design in agitation that will be for your good, (and your children's good also, as long as your natural life in this world, if you please to accept of it,) I thought it convenient and necessary to give you timely notice of it, that you may not be surprised, but may have time to consider of it. The business is this; there is a friend of ours that is a widower, that is of this faith, that is a shopkeeper and of a genteel trade, (namely, a salesman and a tailor both, that selleth all new apparel,) and he hearing that you are a shopkeeper (though of another trade) and of this faith, and of a good natural temper, doth conceive you would make a good wife to live here at London, if you shall think good.

The man's name is John Croxen; he liveth at the corner house at Houndsditch; it is the best house for trade in all the street, being a corner house. His trade doth bring in at least two or three hundred pounds a year. And as for his person, I suppose you will not dislike it; and for his age it is very suitable unto yours, he is about four or five and forty years old is the most, (and I suppose you are seven or eight and thirty years old, which is very suitable.) And this is one of this faith we own, and we know him to be as good a natured man to a wife as any I know in the world. I know you may live in as much splendour and credit as any merchant's wife in London doth, if you have him to your husband. You shall have a maid servant, and men servants to be at your command. My wife's brother's son is apprentice with him, and hath served now, at Midsummer, five years of his time; which if I had not known him to be a good natured man, (and a good trade,) he should never have been put apprentice to him.

All the rich believers here in London do very well approve of his having of you to wife, and of your having of him to your hasband; and would be glad to have you live at London; that you may be numbered among the rich in this world—as well as being numbered with the rich in faith, rich in the world to come, as I know you will. Besides I cannot conceive how you can raise yourself, or prefer yourself or your two children, if you should match with any man there in the country. Though it were with a man of a hundred a year, yet your person will be made a mere drudge, and your children mere slaves. Neither is there any of this faith there in that country (as I know of) that is worth any thing considerable; and for you to match with one that is contrary, it will cause shipwreck to be made of the peace of your mind, which is of more value than the whole world.

Now I shall tell you how the state of this man's condition is; that if you cannot bear with it you shall have your liberty to choose or refuse, and save him a journey. This John Croxen hath had two wives, and hath at this time five children, all alive. Two by the first wife, before I knew him; and those two are both out of the way—the daughter getteth her living, being a good needle-woman, or at service; or might be married, but her father doth not like the man that she would have, because he hath no trade, (for a trade is the surest thing to get bread in this England, if a man be a good husband;) the other is a boy that is apprentice to a silk weaver, which hath served great part of his time, so that he will be no trouble nor charge to his father nor his wife. And by this last wife he hath three daughters; the eldest is (I think) a matter of twelve or thirteen years old, and she is put apprentice to a friend of ours for five years, to be a shop-keeper. So that there are but two young daughters that are at home with him; the one of them is about eight years old, and the other (I think) about four years old. These two must be at home—yet no great trouble to his wife, because the maid can make them ready and send them to school. For if you should be his wife you would do more good ten times, in looking to the shop and selling of garments, and to know the prices, and learn the trade; that in case he should die before you, you may drive the trade yourself. Thus I have given you an account of the whole matter.

Now he and William Chaire, a batchelor, do intend after Whitsuntide to make a journey into those parts, to see you and other friends in Staffordshire. Mr. Croxen cometh only to you, upon that account as to make you his wife, if you like the man when you see him. And William Chaire he cometh on purpose to Elizabeth Burton, to make her his wife if she will accept of him: he had a great love for her when she was here in London.

But now, dear friend, the case is thus; you must send me word whether you are resolved to keep yourself a widow always, or whether you are resolved to live there where you are always, or whether you are minded to change your condition you are now in, or whether you will suffer him to come to see you. And if you do not like him when you have seen him, you shall have liberty in your mind to refuse him; for I would not persuade you to anything against your own mind, nor advise you to anything that were not for your good. Therefore I would desire you to send your answer unto me as soon as you can conveniently (and as short as you can) to these particulars, in the latter part of this letter. Likewise, I desire you not to let any of our friends in those parts see this letter, neither would I have you to mention it to any one, till after you have given me your answer. And if you do incline in your mind to hearken to the conditions contained in this letter, then keep it to yourself, and let none know of it; until Mr. Croxen and William Chaire doth come to see you and the rest of our friends, which will be after Whitsuntide. So, with my love and my wife's love remembered unto yourself, I take leave, and remain

Your friend in the true faith,
LODOWICKE MUGGLETON.

London, the 18*th day*
of April, 1685.

Direct your letter unto me, thus, For Mr. Delamain, upon Bread Street, Hill, at the sign of the "Three Tobacco Pipes," in London.*

This curious letter affords no bad index of Muggleton's character on its practical side. He combined with his large and dogmatic claim to a specialty of religious teaching considerable acuteness and experience in the management of affairs. In his own calling he was industrious, and apparently successful, until his peculiar religious position began to interfere with his temporal advancement; but neither before nor after that period, though acutely sensible of the advantage of means and position, did he shew on his own behalf any greed of gain. Very early in life he relinquished the fair opportunity of a prosperous marriage, because his conscience would not allow him to sanction the making of money by usury; some years later he lost "a great stroke of work" at his trade, because he could no longer follow the Puritans in church fellowship; he prides himself on his independence, asserts that while he had "spent many a pound for the Commission's sake," he "did not live of the Gospel, as the Apostles did, without working," and claiming to be "more true in that particular than ever any Apostle was, or ever any Quaker was."† When he gave up business he could fearlessly affirm: "I owe the world nothing; I never wronged any in the world the value of sixpence in my life, to my knowledge."* His calling was one against which jokes have been directed, ever since mankind first profited by the productions of its skill, yet he continued to take an honest pride in it. "What were the prophets of old, many of them, but herdsmen? and the apostles but fishermen? Very mean employments; yet God hath honoured them with great honour, and hath made poor men kings, prophets, and apostles. And why should it seem strange to the world, that God should choose two tailors . . . to be His two last Prophets and Witnesses of the Spirit in this last age of the world? A tailor is more honourable with kings, and princes, and noblemen of this world than herdsmen and fishermen."†

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* *Supplement, ut supra,* pp. 44—47.

† *Spiritual Epistles,* 2nd Edition, 1820, p. 113.

He was proud, too, of the old Northamptonshire stock from which he came, and of the great London in which he was born. With a pardonable feeling of the John Bull kind, he describes himself as "a free-born Englishman, and a freeman of London by birth, and never was out of England in all my life." A great dread of the perils of the ocean not only forbade him "to concern himself with any ship or sea affairs, if it were ever so much for his profit," but kept him from ever quitting English ground. "I have," he writes to a friend in Ireland, "such an antipathy in my nature, that if I might have ten thousand pounds I would not come through that sea gulf to see you; though I have travelled several thousand miles in England in my time by land."‡ Indeed he can find no simile strong enough to realise his imagination of the horrors of the sea passage, than that great gulf which cut off communication between Dives in hell (Ireland) and Lazarus in heaven. His amusing hatred of England's ancient northern foe has already been referred to.* Of foreign nations or of foreign affairs he never seems, judging from his letters, to have taken much notice. When one of his friends thought to better his fortunes by emigration to Virginia, "I wonder," wrote he, "what is in men's minds, to run amongst the heathens who are without God in the world. My nature is so contrary to go out of the land of Canaan, of England, amongst the heathen, that I had rather live in prison here all days of my life."† Nay, even of home politics he seems to have been quite unconscious, except when the legal enactments of his time pressed indirectly upon him or his followers. He lived through the most exciting period of English history; he honoured and reverenced Oliver Cromwell as a true "Lion of the tribe of Judah"; yet his correspondence, so far as it is preserved, contains not a single allusion to the restoration of the monarchy, nor does it even speak of events which must certainly have touched him nearly, the Great Plague and Fire of London. Public matters had no interest for him; he was equally happy under a monarchy, a commonwealth, or a dictatorship. He only asked to be let alone. Yet though in this respect he was one of the quietest and most easily governed of subjects, he was by no means the man to sit down tamely under oppression. Every constitutional means that could be taken for the maintenance of his own liberties he would take; and he had somehow possessed himself of a very accurate knowledge of the limits and the requirements of the law. His constant endeavour on his own part, and his constant recommendation to his followers, was never to come into conflict with the law of the land, or give spiritual enemies a legal handle against them. He never would have them resist the arm of the law, but besought them to pay the stipulated fine at once, when brought into trouble through refusing to take the oath of allegiance or to attend at church. "It is only a money business." "It is better to give them their fess now while it is but little, so you can keep the mind free from oaths and worship." "It is better to part with silver than to part with peace of conscience."* Such was his sound advice, and such, it may be added, was his own constant practice. He paid fines repeatedly, because, having been chosen to serve on various parish offices, such as scavenger, questman, or constable, he refused to qualify for them by taking the oath of allegiance.

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† *Spiritual Epistles, ut supra*, p. 440.

* *Ibid.*, p. 474.

‡ *Supplement, ut supra*, p. 54.

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* The prejudice extended to his followers, and was not overcome till the time of John Peat, a Scotchman by birth, and a leading Muggletonian, between 1750 and 1774.

† *Spiritual Epistles, ut supra*, p. 405.

The refusal to take an oath was a common scruple with tender consciences at that day; and along with it generally went the belief that it was unlawful to make war, or to bear arms. Muggleton was not so rigid and absolute in his objection to the former as the Society of Friends have always been. Where an oath was a mere legal form and order in a court of justice, he permitted it to be taken. The only oaths utterly forbidden to him were "swearing to unrighteous things," and swearing vainly in common discourse.† He made but one exception, however, to the unlawfulness of war, and it is a characteristic one. He allowed a disciple of his, Thomas Nosworthy, a settler in Antigua, to bear arms "for the defence and preservation of the temporal life, and the estates of the people, against the heathen, and any other enemies that seek to invade that island." The case was different "in those strange islands, amongst the heathen," to what it was "here in England, Ireland, and Scotland, who profess all one faith; though very few have true faith. . . . Therefore, as the old proverb saith, 'If you will live at Rome, you must do as Rome doth.'"* Here we see something of his contempt, not only for aliens, but also for those who left their native land for the chances of success on foreign soil.

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* *Spiritual Epistles ut supra*, pp. 112, 107, 181.

† *Ibid.*, p. 59.—He was opposed to capital punishment, even for murder. *Div. Looking-glass*, chap. xiv.

The profession of a soldier was not the only one which Muggleton regarded as unlawful. He condemns each one of the three learned professions, not sparing any. When he was consulted on the choice of a profession by a young disciple, John Cowlye, who had received his education at the University of Cambridge, Muggleton "convinced him of the unlawfulness of all three, for any saint or God's elect to undertake." We should hardly expect him, considering what was his religious position, to have a good word for the clerical vocation. He pronounces their ministry all false, "from the first Pope to the last Quaker," even one as well as the other. "As for the doctors of physic, they are the greatest cheats, upon a natural account, that are in the world. They cheat people of their money and of their health; and it would be good if there were never a doctor of physic in the world; people would live longer, and live better in health. For God never appointed any doctor of physic, but he appointed nature to preserve nature." "And as for the lawyers, they keep the keys of the knowledge of the law, and will neither enter into truth and honesty themselves, nor suffer others to enter in that would." Hardly is there a man to be found but is "deceived either by the physician, lawyer, or priest. Nay they deceive one another, for the priest is deceived by the doctor of physic, and the doctor of physic is deceived by the priest . . . . And as for the lawyer, he cheats the doctor and the priest both . . . . and they do the like by him . . . . so that they get pretty even one with another. But all people besides, that deal with them, are sure to be deceived and to lose by them." After such an exposition as this (which is much fuller and more fearful in the original account, where it goes into questions of the world to come), we need not wonder that "when the young man heard these things, he left all preferment that way, for truth's sake, and became a steadfast and true believer; and he, being a scholar, was mighty able to oppose the learned."*

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* *Spiritual Epistles*, *ut supra*, p. 469.

Among the scruples which Muggleton derived from his puritan training was an abhorrence of card-playing, which he classed with drunkenness,† and other vices of a reprobate life. Yet he was not averse to amusement on its own account, or to the enjoyment of life in a sober and chaste way. Against the vice of uncleanness he was especially severe, and in his own person he seems to have been, not simply strict in outward conduct, but pure of mind. True, his language is plain enough, and now and then runs into coarseness, especially in invective; when provoked, as he admits, he could sometimes speak "unsavoury" words. He was a puritan in the severity with which he reprobated whatever approached to vice or to injustice. In his sober common sense view of things, and in his genuine love of toleration and hatred of all kinds of religious persecution, he was something more than a puritan. "I always loved the persecuted better than I did the persecutor," he writes to George Fox; "and I always had compassion upon the afflicted for conscience-sake, though I knew they suffered for a mere lie, as all you Quakers do. Yet I say, whoever doth persecute you for conscience in meeting and worshipping an unknown God (as you Quakers do), I say those men that do persecute you willingly, will be every man of them damned to eternity."‡

From some of the prevalent superstitions and delusions of his age he was singularly free. Witchcraft was still, in his time, widely believed in and feared. He treated it as a sinful surrender on the part of witches and possessed persons to the power of their own disordered imaginations; and wrote a treatise (which he himself valued very highly), called the *Witch of Endor,* expressly to apply this explanation to the Scriptural accounts of witchcraft. He laughs at the popular notion that witches have power over "infants, which are not capable of fear; for fear and belief are the inlet to all witchcraft."* In like manner he interpreted the phenomena of demoniacal possession as evidence only of disease. Distracted men, madmen, or fools are "possessed with devils, that is, with distempers of nature. These are devils that are produced through accidents of nature; some extraordinary grief, fright, or loss hath broke the brain, and so the seat of reason is quite out of order."† In harmony with this rationalistic explanation Muggleton seems inclined, not only to spiritualise certain of the miracles of our Lord, but even to regard the spiritual meaning as the only legitimate sense of some of them; *e. g.*, of the casting of the demons into the bodies of swine.‡ His strong disinclination to the ready acceptance of mere marvels is aptly shown in a postscript to a letter, bearing date 19th June, 1669, and addressed to his friend Thomas Tomkinson, which to us, who have lately been favoured with the story of the Welsh fasting girl, will not be without interest. "I would desire," he writes, "when you send to me or Mr. Delamaine, if it be not too much trouble, [that you would tell me] whether that maid that fasted a whole year, as was reported, be alive yet, or no; because I heard at Chesterfield for certain that she was yet alive, and that it was a mere cheat to get money."§

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* *Acts of the Witnesses, ut supra*, pp. 112, 114. *Whole Book of Revelation, ut supra*, pp. 239, 244.

† *Acts of the Witnesses, ut supra*, p. 125.

‡ *Letter to George Fox*, 2nd Edition, 1756, p. 88.

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* *Spiritual Epistles, ut supra,* p. 412.
† *Letter to George Fox, ut supra,* p. 65.
‡ *Stream from the Tree of Life,* Edition of 1758, p, 59.
§ *Spiritual Epistles, ut supra,* p. 291.

Lodowicke Muggleton's end was a peaceful close to a long and, in some respects, an arduous life. The old man's latter days, spent amid the reverence of his followers, and watched over by the faithful affection of his wife, must have been happy. "Upon the first day of March 169$\frac{7}{8}$, the prophet was taken with an illness and weakness; upon which he said these words, 'Now hath God sent death unto me'; and presently after was helped to bed. And though he kept his bed, yet we could not perceive that he was sick, only weak; and he lay as if he slept; but in such quietness as if he was nothing concerned with either pain or sickness. So that it was mere age that took him away. The fourteenth day of March he departed this life, with as much peace and quietness as ever any man did, being about eighty-eight years of age; so that he had that blessing to come to his grave in a full age, like as a shock of corn cometh in at his season. Upon the sixteenth day his corpse was removed to Lorimer's Hall [close to his house in the Postern, where he died], and on the seventeenth day was from thence attended on with two hundred and forty-eight friends, with six of us appointed to carry the pall, each with gloves and hatbands, accompanying him to Bethlehem Churchyard: where he was buried by [beside] his fellow Witness, which was according to his own appointment."* The rhyming inscription on his tomb was quoted in a former paper. A copy of verses, entitled *An Elegy on the Death of Mr. Lodowicke Muggleton,* appeared shortly after his decease, and, though not written by a disciple, was printed as a broad-sheet at the request of his followers, in 1698, and has by them been at least twice reprinted, in 1754 and 1831.

In the portrait of Muggleton we may easily discern the traces of that combination of integrity, shrewdness, and determination, which formed his somewhat remarkable career. There exist three original likenesses of him. Of these the best executed is an oval oil painting of the head and bust, looking to the right, at present hanging in the Bird Gallery at the British Museum. It was presented anonymously to the Trustees of that institution, through Dr. Maty, the then Librarian, on the 26th October 1758. There is a memorandum in pencil accompanying the Report on the subject of the presentation, "aged 66, 1674." Another most interesting painting, is a full length (also looking to the right), by Muggleton's friend, William Wood, of Braintree, now in the possession of the Muggletonian body. It was formerly in the hands of Mr. Tweene at Ware, at whose death it was purchased by the late Mr. Isaac Frost. Of more value than either of these, perhaps, is the cast of the prophet's features taken after death. This also is in the possession of the Muggletonian body. Copies have been taken from it at different times; on the last occasion (early in the present year) the original was unfortunately broken, yet not so as to injure the face; it has been carefully put together again, but has not been improved by a new coat of thin black paint. It had been painted black at a former period. From this cast a small copperplate engraving was executed at an early date. It bears the engraver's name, G. V. Caffeel, but has no date. The plate is in the possession of the Muggletonian body; it is poorly engraved and nearly worn out; early copies of it are rare, as it seems to have been much in request among the believers. A small oil painting was made from it in May 1813, by Richard Pickersgill, himself a Muggletonian; of this several copies are in existence, one of them being preserved by the Muggletonian body. In 1829, at the expense of Joseph and Isaac Frost, a half length engraving was executed by J. Kennerley, from the full length portrait. This is usually found prefixed to the Divine Song-book, and is to be had separately. It does the original from which it is taken no sort of justice, and introduces accessories, allegorical and otherwise, which are peculiar to itself. This engraving has been photographed in carte-de-visite size. Muggleton's personal appearance furnished matter for jest to his and George Fox's opponent, Charles Leslie, who compares the two men in respect of their "long straight hair, like rat's tails;" and adds, "it hath been observed of great enthusiasts that their hair is generally slank, without any curl; which proceeds from a moisture of brain that inclines to folly. It was thus with Fox and Muggleton."* An early and good copy of Caffeel's engraving, prefixed to the copy of the first edition of the *Acts of the Witnesses*, in the Lambeth Library, has written below it these words, in a contemporary hand: "He had yellow hair and a ruddie cōplexion."

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* *Acts of the Witnesses,* first Edition, 1699, end of Epistle Dedicatory by Thomas Tomkinson.

It is time to speak of some of the prominent followers of Muggleton. The "eldest son of the Commission of the Spirit", as he has been called, was JOHN SADDINGTON, a Leicestershire man, from Arnesby, who seems to have been afterwards engaged in business in London in the sugar trade. He was a fine handsome fellow, and is addressed, in a copy of contemporary verses, as "John Saddington the tall." He it was who, at the time of the rebellion against the Nine Assertions, did most to secure the attachment of the wavering believers to their absent chief. He is the author of two works in print, and of three or four which remain in manuscript.

But though not the "eldest son," yet certainly the chief advocate of the Commission was THOMAS TOMKINSON, of Sladehouse. This staunch defender of an unpopular faith came of an old family of Staffordshire yeomen, who for generations had held the farm of Sladehouse,† in the parish of Ilam, not far from Dovedale. About Easter of 1869, the present writer made a pilgrimage to the locality, and examined the registers of Ilam and Blore-Ray, in search of traces of the family. There are plenty of such traces to be found, but, owing to the extreme frequency with which the christian names Thomas and Ann occur in various branches of the Tomkinson family, it is very difficult to extricate the lines of descent. Their pedigree goes up to a William Tomkinson, who died in 1559. Several members of the family appear to have been, for their station, men of some culture. There is a curious tablet in Blore church to the memory of Thomas Tomkinson, who died in 1640, respecting whom the local tradition is that he was a great scholar. Another ancient member of the family, a former tenant of Town End Farm, in Swinscoe, is celebrated as having been a man of huge stature; a qualification of which the rural mind was probably a better judge than of scholastic attainment.

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* *Leslie's Theological Works*, 1721, vol. ii. p. 357.

† This Sladehouse was the scene of the murder of Joseph Mycock by his younger

Our Thomas Tomkinson, born in 1631, the son of Richard and Ann Tomkinson, of Sladehouse, was a great reader from his youth, and his favourite subject was church history. He had himself "procured a library of Presbyterian books,"* and from his landlord, the Earl of Ardglass, at Throwley Hall, he "borrowed St. Augustine's *City of God*, and Dr. Hammond's Works." His mother "a zealous Puritan," was "a virtuous good woman, and greatly charitable." His father seems to have been but an incompetent person: at his wife's death, he made over his affairs to his son, and boarded with him as a lodger. Tomkinson heard nothing of the Commission of the Spirit till he was thirty years old,

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brother Benjamin Mycock, on the 10th February, 1812. They were sons of a labourer at Grindon, and the elder brother, who was forty or fifty years of age, had married his former employer, Mrs. Sarah Maulton, of Sladehouse.

* *Truth's Triumph*, pub. 1823, p. 258.

when he came across one of Claxton's books, the very title of which not only startled him, but more than half convinced him that there was truth in it. A year later he arrived in London, on May-day, 1662, expressly "to see and discourse with the surviving Prophet." He found him in Great Trinity Lane, at work at his trade, and enjoyed some conversation with him. At this time he was on the eve of matrimony, and on his return home he united himself to "a good virtuous maid." This step threw him back somewhat in his allegiance to Muggleton. His father was a decided enemy to the faith; his wife did not favour it, though she was, he says, "pretty moderate. So, to please an old father and a young wife, I went to church by fits." A man of his intelligence, however, soon made other converts, and a community of Muggletonians, over twenty in number, sprang up in the north-eastern corner of Staffordshire. They met occasionally at each others' houses, but still went sometimes to church. A quarrel in 1674, with the parson of his parish seems to have precipitated Tomkinson's hostility to the Establishment; and henceforth he went no more to church. In consequence of this he was vexed with writ after writ, accused of popery, and injured in his farm business. His great enemy was one Archdeacon Brown; while his great friend was a certain Archdeacon Cook, who had overheard him zealously contend with a Quaker, at the Dog Inn, in Lichfield, on behalf of the doctrine of the resurrection of Christ's body. He was excommunicated by his parson; but, through Archdeacon Cook's interest, and the payment of a fine, he received absolution of this sentence. On this fact he thus moralises. "On the Sunday following, he [the parson] published my absolution and remission of my sins; and so I was taken into the Church as a dear brother, through a little money and friendship. . . . And truly I thought it was cheap enough to escape their Hell and to gain their Heaven for twenty shillings charge."*

Some years after this he removed to London, and became one of the most zealous pillars of the Muggletonian community there. But few of his many written contributions to Muggletonian literature have found their way into print; one only, so far as I am aware, was published during his lifetime, *The Muggletonians Principles Prevailing, by T. T.* 1695, being an answer to Dr. John Williams' (anonymous) *True Representation of the Absurd and Mischievous Principles of the Sect commonly known by the name of Muggletonians*, 1694. Others of his numerous works were circulated in manuscript; and those which have been published are still much read and highly prized by his fellow believers. They are clearly and logically written, entertaining and powerful. Much cannot be said for their grammar or their orthography, which latter forms a system by itself. Nor is it possible to avoid noticing the singular and almost incredible blunders, which, however, were only the natural pitfalls in the literary path of a man who made himself a great reader, without the requisite education to correct and balance his reading. Nothing which it has ever been our good fortune to come across, in the way of literary blunders, can compare with the following remark of Tomkinson's upon Aristotle. He quotes as Aristotle's opinion, "that law that is most filled by reason must needs be most victorious and triumphant," and then adds, "Howbeit, Aristotle was something dampled in his judgment by reading Julius Scalinger, who said that the beginning of reason was not reason; Aristotle, admiring of this sentence, said, Certainly there is something before and better than reason, wherein reason itself had its rise."* The picture of the old Greek perusing the sage criticisms of his modern commentator, and being "something dampled in his judgment" thereby, until admiration ensued, is conceived in a truly delicious vein of exquisite anachronism.

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* These facts are taken from a MS. narrative, entitled *The Christian Convarte, or Christianytie Revived..... by that Christian Convert, Thomas Tomkinson, written in the year of our Lord God* 1692. The copy above used seems to have been transcribed by Ardon Bonell, *circa* 1740.

Here it may be well to say something about the Muggletonian sacred books. They recognise, first of all, in common with all Christians, the Holy Scriptures of the Old and New Testaments. They exclude, however, the Apocrypha of the Old Testament from the canon, following here their puritan origin; † they exclude also the writings of Solomon, as being the utterances only of natural wisdom. "Solomon, indeed," says John Reeve, "was a very wise man, but I never read that he was a holy or prophetical man; therefore it does not appear to me that that he was a penman of Holy Writ."‡ In this way they get rid of the testimony of Ecclesiastes to the separate existence and destiny of the soul.

Second only to the received books of Scripture, the Muggletonians venerate that curious and ancient production called the *Testament of the Twelve Patriarchs*, an apocryphal work, older than Origen's time, and probably dating from the second century; but which they, like Bishop Robert Grosseteste of Lincoln (1175—1253), who introduced it into this country, refer to and quote as inspired. Grosseteste first heard of the book from John de Basingstokes; he at once sent to Athens for it, and himself translated it from the Greek to the Latin. It was first printed in 1577, englished by A. G. (Arthur Golding), and has been very frequently reprinted down to the present time, often with woodcuts, as a sort of chap book. Dibdin describes it as "one of the most popular manuals of the sixteenth and seventeenth centuries." Whiston held it to be of canonical authority.* The first mention of it by a Muggletonian writer, is to be found in a manuscript letter by Thomas Tomkinson, in 1674.†

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* *Truth's Triumph, ut supra*, p. 178.

† The same circumstance led to a preference for the "Old Translation," or Geneva Bible, which was greatly strengthened by finding in it such renderings as "there is no man good but one, which is God," and "their soul dieth," &c.

‡ *Joyful News, ut supra*, p. 8.

A similar place to that occupied by the *Testament of the Twelve Patriarchs,* among the standard authorities of the Muggletonians, has been allotted to the *Book of Enoch,* ever since its appearance in English in 1821. This apocryphal book was, up to the time of St. Augustine, much prized by the Christian Fathers. It passed out of sight, however (with the exception of a few Greek fragments in the *Chronographia* of Syncellus), until in 1773 some manuscripts of the Ethiopic version were brought to Europe by Bruce, the Abyssinian traveller. One of these was deposited in the Bodleian Library, and from it the English version of Dr. Laurence (afterwards Archbishop of Cashel) was made, and published at Oxford in 1821. Laurence also published the Ethiopic text in 1838; and another Ethiopic text was published at Leipsig in 1851, by Dr. A. Dillman. Two German translations have appeared since 1833, and the book continues to excite much interest and controversy among biblical and oriental scholars. It may occasion surprise that this book should so readily have been adopted as canonical by the Muggletonian body. It is even more remarkable, considering that no English version of any part of it existed in Muggleton's own time, that we should find the following passage in a letter of his in 1682. "The first man God chose, after the fall of Adam, was Enoch; and God did furnish him with revelation to write books. . . . . . He left this revelation to

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* *Notes and Queries,* second series, vol. vi., p. 3.

† It may be mentioned that there is now a very excellent and scholarly edition of the Greek text, with an introductory essay, attributing the origin of the work to the Nazarene body. See *The Testaments of the XII. Patriarchs: An attempt to estimate their Historic and Dogmatic Worth.* By Robert Sinker, M.A., 1869.

Noah, and Noah left it to Shem, and Shem left it to his sons, until it came to Abraham, Isaac, and Jacob. So that [this was] Enoch's revelation and declaration to the fathers of old; and all that did believe the books of Enoch, they were as a Parliament to enact it as a Statute-Law to their children from generation to generation for ever."* The late Mr. Isaac Frost was, it is believed, the means of introducing the book to his fellow Muggletonians; and he makes considerable use of it, in his painstaking and handsome work, *Two Systems of Astronomy* (1846), as confirming the Muggletonian, in opposition to the commonly received theory of the Universe.

Next in order come the writings of John Reeve and Lodowicke Muggleton, regarded, though not verbally inspired, as of equal or greater authority than Holy Scripture; at least so far as the enunciation of the Six Principles is concerned; because the "Commission of the Spirit hath deeper mysteries held forth in it than the other Commissions had."† Muggletonians speak commonly, therefore, not of Two Testaments, the Old and the New, but of Three; they enumerate Three Records; Three Commissions, each to be obeyed in its own time and place, and having force so long as God sustains it. The Commissions of the Water (that by Moses), and of the Blood (that by the Apostles), have made way for the Commission of the Spirit, which is thus at once the last and the highest. Any further development of revelation they believe to have been expressly excluded by the voice of God.

Muggletonians have no recognised formula of Creed. Adherence to the Six Principles is the sole criterion and requisite of membership to their Church. At different times, however, private believers have drawn up statements of their doctrinal belief. Thus in 1675, John Saddington elaborated XLVIII. *Articles of True Faith,* which were printed in 1830. In 1723, an anonymous believer drew up XXXVI. *Articles of the Third Record;* and in 1794, William Sedgwick (apparently in consequence of the Birchite Schism) prepared XVI. *Articles* to express the true Muggletonian belief. Neither of these two formularies have been printed. A printed paraphrase of the Apostles' Creed in the Muggletonian sense, with Scripture references, which is signed James Tennant, is sometimes found pasted on the fly leaf of Muggletonian books. The earliest copy of this is printed in black letter, but it bears no date, nor is anything known respecting its author. There is also a curious rhyming Creed of twenty-eight lines, in manuscript, perhaps a hundred years old, which seems from its condition to have been suspended from a wall, or otherwise publicly exhibited.

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* *Spiritual Epistles*, *ut supra*, p. 516, and again p. 587. Muggleton no doubt derived his impressions of the book from the references to it in the *Testament of the XII. Patriarchs*.

† *Stream from the Tree of Life*, *ut supra*, p. 32.

It will not do to forget, in this connection, the collection of *Divine Songs,* or *Songbook,* as it is familiarly called, which supplies to them the place of a collection of hymns, and indeed is the only approach to a devotional manual. For while prayer is by them eschewed, songs of gratitude and thanksgiving are deemed lawful, though by no means incumbent upon any believer who may think them savouring too much of the exploded idea of worship. Collections of these Songs were circulated in manuscript from the earliest days of the sect, many of them having been written by the immediate followers of Muggleton. A great number of these manuscript collections are still preserved by the body; several of them being in the autograph of the composers. The first mention of a printed Songbook in the records of the body, is on the 16th February, 1794; many entries of the sale of the volume are to be met with up to 14th August, 1796. No copy of this book has fallen in the present writer's way; it seems, from a letter of James Frost, 29th March, 1812, that it was not executed at the expense of the body, but "made a present of to the church by a printer." The church, however, compiled in 1829 the collection at present in use. It consists of two hundred and twenty-eight Songs, all by Muggletonian authors, and a good number of them expressly written for the collection. The largest contributor is Boyer Glover, a London watch-and-clockmaker, who may be deemed the poet of the Muggletonians. His name first occurs in their records in 1771. He contributes forty-nine Songs. James Miller (who wrote between 1730 and 1750), follows with twenty-seven. There are one or two by John Nicholls, a musician, who "played on the Lord Mayor's Day and in the waits," who died, old and helpless, about 1745, and through whom the only fragment that exists in John Reeve's autograph came into the possession of the body. The earliest Song-writers seem to be Thomas Turner, John Ladd, William Wood, Elizabeth Goodwin, and Elizabeth Henn. Thomas Tomkinson also tried his hand at verse composition.

It is not very difficult to estimate the extent to which the Muggletonian doctrines have met with success. Their influence has been confined almost entirely to the small body which professes them; for their writings have seldom been published in the ordinary way; they have never invited converts, and have found no opportunity, and looked for none, of bringing their opinions before the notice of the world. Neither Reeve nor Muggleton were preachers; they disseminated their views in conversation and by letter: and this has ever been the habit of the body. Persons of influential position have rarely been attracted to their community, but the personal character of its members has always stood high; few in numbers, they are and have been an industrious, and, in the main, a well-to-do and thriving set of people. Muggleton's own times were the palmy days of the society, as respects the social standing of its members. He could point among his supporters to people of all classes, from Colonel Robert Phaire, the governor of Cork, to good, "sober, and conscientious" Mistress Dorothy Carter. Both of these had come to Muggleton from the Society of Friends, and from this body, as well as from their predecessors the Ranters and the Anabaptists, he received many, if not most, of the early adherents to his cause. In their case (as in Reeve's own), the change was a natural consequence of the exhaustion of their previous views, which threw them, by an inevitable reaction, into the opposite extreme.

In the absence of any express information, we must refer to such casual indications of the progress of the body as we may discover in their own writings, or in other places. Already, in 1654, two years after the revelation of John Reeve, some of their books had found their way to New England, when an order was made that every inhabitant who had in custody "any of the books of John Reeves and Lodowick Muggleton, 'who pretend to be the two last witnesses and prophets of Jesus Christ,' which books were said to be full of blasphemies, should bring or send them in to the next magistrate, within one month, on pain of ten pounds for each book remaining in any person's hands after that time."* By 1660, Muggleton himself testifies of his Commission, that "the sound of it hath gone through many parts of Christendom, as in this part of England, Scotland, Ireland, New England, Virginia, Barbadoes, and many other places I will not here mention. But the doctrine of the Commission of the Spirit hath been very little received in the world; but the most that have received it are here in London, and in Cambridgeshire, and in Kent."* In 1669, the Muggletonian views were thus introduced to the continent of Europe. "There is a great increase in the faith," writes Muggleton, "here at London, and in some countries. There have been with me of late two or three German men, that were banished out of Germany for not submitting to the worship set up by that power. . . . . . The one of these is a doctor of physic, and another was a minister in Germany. The minister could not speak English as well as the doctor, but the doctor bought all the books, and hath written the Commission Book into the German language, and hath sent it among the Germans. So what the issue will be, time will bring forth; for there are many that would believe, did they but understand it in their own language."† In spite of this it remained true that a prophet is without honour in his own house. "This thirty-three years that I have been in this Commission," confesses Muggleton in 1685, "there hath not [been] one neighbour, or acquaintance, or kindred here in London (as I know of) that hath believed my report, save my own children."‡

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* Hutchinson's *History of the Colony of Massachuset's Bay*, 2nd edition, 1765, p. 196. Hutchinson evidently supposes them to have been Quakers. The books probably came from Bristol, where there were believers in 1654. *Sac. Rem.* p. 59.

Still the Muggletonian views made way, and were handed down, from generation to generation, although obscurely. Out of London, the first society of believers appears to have been that which John Reeve visited in 1656, when he found some half score believers near Cambridge, poor men, "husbandmen and tradesmen, that labour for their bread."§

We have seen already that, about the year 1664, there were over twenty believers in Staffordshire. In September, 1667, it was reported, in "an account of the number of the conformists, nonconformists, &c.," that, "at Ashford [in Kent] and at other places, we find a new sort of heretics, after the name of Muggleton, a London tailor, in number thirty."* In the seventeenth edition of Edward Chamberlayne's *Angliae Notitia,* 1691, they are mentioned for the first time, and placed among the dwindling sects. In the eighteenth edition, 1694, we are told (p. 378), "the Muggletonians are scarce extant." The same words appear in succeeding editions till the twenty-first, in 1704, when all mention of this body is omitted. In William Maitland's *History of London,* 1739, there are enumerated (p. 517), among the places of worship (which, of course, is a mistake), two Muggletonian Meetings, one at Barnaby Street (south of St. Olave's, Southwark), and the other in Old Street Square (top of Aldersgate). This information is repeated in the Rev. John Entick's edition of Maitland, in 1756. A careful search of their records since 1770 would enable us to ascertain pretty accurately the names and numbers of the London Muggletonians from that time to this. There is a manuscript "Collection of the names of male friends residing in England, 14 August, 1803," which contains ninety-eight names, distributed over London, Kent, Hertfordshire, Norwich, Derbyshire, Bristol, Oxford, Walworth (and one in Ireland). The lists of subscribers' names prefixed to the *Interpretation of the Revelation,* 1808 ; to the *Volume of Spiritual Epistles,* 1820; to *Truths Triumph,* 1823; and to the *Songbook,* 1829, are useful in this connection.

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* *Spiritual Epistles*, *ut supra*, p. 36.

† *Spiritual Epistles*, *ut supra*, p. 293.

‡ *Spiritual Epistles*, *ut supra*, p. 575.

§ *Supplement*, *ut supra*, p. 2.

In 1863, one of their body estimated their numbers as follows :—"There are, perhaps, two hundred and fifty, or three hundred, in London and its suburbs, a few in Kent, about sixty or eighty in Derbyshire, twelve or fifteen in Nottingham, and half a dozen in Mansfield; but as we believe that public worship is not now acceptable to the Deity, of course we have no places in which to meet for worship, and no record of our numbers, so it is very possible that there may be Muggletonians in other districts with whom I have never communicated. For example, those in Derbyshire were ignorant of the existence of any persons entertaining the same faith in London, until one of their number removed thither to seek employment, and, after residing there a short time, heard of the London brethren by mere accident."*

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* *The Genuine Remains of Dr. Thomas Barlow, late Lord Bishop of Lincoln,* 1693, p. 313.

No regular and systematic records of their history have ever been kept by the Muggletonians. The manuscripts in the possession of their body, which do not seem to have been formally examined and collected before 1772, the time of the Birchite schism, and have not yet been catalogued, consist of I., a number of expository treatises, poems, songs, and other writings, illustrating the growth and character of their peculiar faith; II., a large collection of letters, some trivial enough, but many of them curious and interesting, extending, but in no connected series, from the origin of their community till the present day; III., a mass of bills and account books, beginning about 1770, and relating to the subscriptions for and sale of their printed books, and the expenses incurred at their social meetings. In 1804, the Community first became possessed of property, through the bequest of Catherine Peers, for the formation of a relief fund; and from that time to the present an exact account has been kept of its monetary affairs.

Among the manuscripts in Class I. are a few (including a transcript of great part of the *Commission Book*), in Muggleton's thick, tremulous, laboured hand-writing, which contrasts curiously with Reeve's fine, clear, minute penmanship. Thomas Tomkinson's stiff, upright, very legible characters (more like printing than writing), and his marvellous orthography, are largely represented in the collection. It seems almost a pity that the modern editors of the early Muggletonian literature should have felt themselves bound to adhere so rigidly as they have done to the grammar and punctuation, though not, except in case of proper names, to the spelling of the originals. The present writer has been obliged, in order to make his quotations intelligible to the general reader, to repunctuate freely, and now and then to smooth over a grammatical inequality, which impaired the sense as well as the elegance of the passage.*

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* Letter by William Ridsdale, *Inquirer*, 21st March, 1863.

There is no room here for an account of the numerous materials embraced in the letters which form Class II.; and in truth, to an outsider, an analysis of their contents would be exceedingly dry, at least where it was not exceedingly ludicrous. Appeals for help, addressed to the London Society, by or on behalf of poorer brethren in various parts of the country, were pretty frequent. One cannot but feel compassion for poor Edmond Feaver (whose tone had been high enough in his day of prosperity), when he writes from Kettering, 28th January, 1759, to John Austin Garrett, the chief person among the London believers, begging for charity with the touching plea, "I am Reduced to the Loest Degree my Coat, wastcoat and Britches are not all worth one shilling."

The various controversies which these letters reveal turn more or less on the original difference (already described) between Reeve and Muggleton as to the immediate notice of God. From an early time there seem to have been Reevites, (or Reeveonians) in contradistinction to Muggletonians.

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* It is not easy to hit the medium between an exact transcript for the curious eye, and too unsparing a revision. George Fox's *Journal*, for instance, has been greatly over-edited from the first. His autographs and his own publications are as uncouth, as those of Muggleton, or more so.

This may be what Muggleton means, when he speaks in 1663 about "those that disadhere unto John Reeve," most of whom however were then dead, and others fallen away from the steadfastness of faith.* Even the Rebellion against the Nine Assertions of Muggleton in 1671, partook in some degree of this party character. For, as Muggleton observes in his Answer, "it is the nature of Reason to believe dead prophets rather than living prophets. And it is the nature of Faith to believe live prophets rather than dead prophets."† A similar division of allegiance is hinted at in Thomas Tomkinson's Epistle Dedicatory to the Acts of the Witnesses, 1699, when he says, (p. vi.) "there can be no salvation to such as shall reject him or his writings, although they pretend to own John Reeve." It may be conjectured that the *Sacred Remains*, published in 1706, which consist exclusively of "treatises epistolary and public by the Lord's last immediate messenger, John Reeve," proceeded from this party.

There were some small internal controversies on other points, as in 1736, when Arden Bonell opposed a new doctrine of the Ascension of Beasts, or the resurrection of the lower animals. This curious discussion, together with some skirmishing on doctrinal points between Bonell and Phillip Lathorp, and again between Bonell and Joseph Horrell; and, a few years later, between John Meall and Edmond Feaver, constitutes nearly all our knowledge of Muggletonian history during the first half of the eighteenth century. No serious division occurred in the Muggletonian forces until that occasioned, about 1772, by the defection of the Birchites. William Crabb, of Braintree, speaks in July 1773 of a "misunderstanding in the Church," and this misunderstanding soon reveals itself as connected with the doctrine of immediate notice and the leadership of James Birch.

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* *Spiritual Epistles*, *ut supra*, p. 129.

† *Acts of the Witnesses*, *ut supra*, p. 150.

This **James Birch**, a Welshman by birth, was a watch motion maker, living near Aldersgate, London. There exists a rhythmical account, from his own pen, of his conversion to Muggletonian views, which occupies fifteen rude stanzas, of eight lines each, and is dated the 5th December, 1771. In the same year his name heads the subscription list to a work of John Brown, of Norwich, on the *Devil's Downfall.* By the next year his opinions seem to have carried him out of harmony with his fellow-believers. He rejected their doctrine, that those who hold the true faith enjoy at once an absolute assurance of salvation, and held that this assurance was often withheld till the hour of death. He believed also, in opposition to Muggleton's teaching, that God does exercise an immediate oversight in human affairs, and affords an immediate inspiration, without which his former revelations are of no avail. He acquired a certain following, who did not, however, as yet formally separate from the original community. By degrees, however, he applied this doctrine of immediate notice in his own favour, and founded a small separatist community of which he was the prophet, immediately directed by a divine call. One William Matthews, of Bristol, was his high priest. This assumption of a prophetic office, in 1778, lost him ten of his followers, who withdrew from him in consequence of it; they did not return to Muggletonian orthodoxy, but remained true to Birch's more sober views, under the leadership of Martha Collier. There were now three divisions among the Muggletonians: the original body or Church, represented by Benedict Shield in London, and Roger Gibson in New York; the Birchites, or Antichurch; and the Collierites, or Immediate-notice people. Birch was maintained in independence by the contributions of his followers, of whom in 1786 there were some thirty in

London, and others in Wales, in the parts about Pembroke. Two strange fantastic books by Birch were printed about the end of last century, they are called the *Book of Cherubical Reason*, and the *Book upon the Gospel and Regeneration*. They are more incoherent than the writings of Thomas Tany, and read like the productions of a madman. Their author seems to have outlived his influence and most of his followers, and to have died soon after the beginning of this century, but when and where has not been ascertained. Whether at this moment there are any Birchites in existence, does not appear. Very likely there may be, for these small sects die hard; but it is scarcely probable that they continue to hold regular meetings. Their last known place of meeting was in the Barbican, and there are several persons living who remember having known Birchites. The influence of their opinions is deprecated in the following opening of a Song by James Frost, written in 1809, and included in the collection of 1829:—

"You faithful Muggletonians, who truly do believe
The doctrine of Muggleton to be the same as Reeve;
Let no wise anti-followers infuse into your ear,
That a prayer Christ does hear from us mortals here below."

As the Muggletonians countenance no form of worship whatever, their gatherings are almost entirely of a festive character. They have two yearly gatherings, or Holidays, one of which at least dates from their prophet's time; for it was instituted 19th July, 1677, for the purpose of commemorating his release from prison on that day, and has been held annually ever since, though now, in consequence of the alteration in the calendar, it is kept on the 30th July. The account of contributions and expenses at one of the earliest of these meetings has been preserved, and is here given, as it is a curious specimen of a tavern bill nearly two hundred years ago.

At our meeteing at Holloway on the 19th of July 1682. At Mr. Hoolbrookes at the Greene Man, Present there

The Prophitt of God	
Mis Muggleton	
Mis Delanall	00 : 05 : 00
Mis Smith	00 : 05 : 00
Mis Webb	00 : 05 : 00
Mis Euans	00 : 05 : 00
Mr Cooper	00 : 05 : 00
Mis Cooper	00 : 05 : 00
Mr Atkinson	00 : 05 : 00
Mis Atkinson	00 : 05 ; 00
Mr Gouldique	00 : 05 : 00
Mr Rich : Smith	00 : 05 : 00
Mr Whitehead	00 : 05 : 00
Mr Brocke	00 : 05 : 00
Mr Symonds	00 : 05 : 00
Delamain Senr.	00 : 05 : 00
Mis Delamain	00 : 05 : 00
Delamain Junr.	00 : 05 : 00
Mr Burrell	00 : 05 : 00
Mis Henn	00 : 05 : 00
Mis Roe	00 : 05 : 00
Receiued	04 : 15 : 00

Monyes Paid away the 19th July 1682, at Mr. Hollbrookes at the Greene Man in Holloway

pd for 18 Pulletts at 14d ℘ Pullett is	01 : 01 : 00
pd for 18 Siuell Oringes at	00 : 01 : 08
pd for 6 penny post Letters of aduise	00 : 00 : 07
pd for the prophitt's Coach	00 : 03 : 06
pd a porter from London wth the fowles	00 : 01 : 06
pd for 5 ℔ & ½ of Bacon at 7d½ ℘ ℔ is	00 : 03 : 04
pd for 5 large Collyflowers	00 : 01 : 00
pd for Bread and Beere	00 : 09 : 04
pd for Wine	01 : 06 : 00
pd for Dressing Meate and fowleing Linning	00 : 14 : 00
pd for 5 Tarts at 16d ℘ Tart	00 : 06 : 08
pd for Butter and Cheese	00 : 01 : 06
pd to the Servants of the House	00 : 02 : 00
pd to ye man of the Bowleing Greene	00 : 01 : 00
ffor 1 Quartern of Tobacco	00 : 00 : 06
	04 : 13 : 07

The other yearly Holiday is the anniversary of the giving of the Commission to John Reeve on the 3d, 4th, and 5th February, 1652, but now kept on the 14th, 15th, and 16th February. The two festivals are referred to as "the Holy Days" as early as 1763, and were probably so termed much before that time. These assemblies (especially the February one) bring together from various parts of the country as many of the believers as can contrive to be present.

In addition to these larger gatherings, more frequent meetings, monthly or weekly, have been arranged from time to time to suit local convenience. This custom dates also, there is little doubt, from the earliest time. "These Muggletonians," writes S. Rogers from Cambridge, in 1692, "meet at their prophet's (as they call him), where he expounds the Scriptures, and answers any question they put to him."* And "about the year 1770," we are told, "there was a small community of Muggletonians, who met every Sunday afternoon in a room one story high, built out in the garden of the Gun, a well known public house, in Islington, where they used to smoke and drink with a great Bible before them."† From the Gun, Islington, in 1770, we can trace their meetings, by help of tavern bills, to the Blue Boar, Aldersgate Street, 1787–1790, and 1796–1802; the Hampshire Hog, Peartree Street, Goswell Street, 1791–1795; the Nag's Head, Aldersgate Street, 1815; the Bull's Head, Jewin Crescent, 1818–1825; the Coach and Horses, St. John's Square, Clerkenwell, 1845, and probably to other similar places. All members of the community were expected to attend these meetings, and to contribute a small sum to the general entertainment; a trifling fine was imposed (in 1799) for non-attendance. Occasionally the fare was provided by special bounty; this was usually the custom on the death of any well-to-do member. Hence we read that, at the monthly meeting on the 2nd March, 1831, "two legs of mutton were had, they being left by Mrs. Sarah Gandar, as a token of her spiritual love to the church, of which the following friends partook in commemoration." The only regulations that seem to have been passed for the conduct of these meetings were such as were designed to exclude discussions on "natural" matters, that is, any subjects except those, which concerned points of faith. A resolution to this effect was passed on 24th November, 1793, and "signed by the Church present," twenty-five in number. Again, on the 4th March, 1798, we find the following prudent regulation subscribed by forty-one members present. "For the peace and good order of the Church, it is agreed on by this Church that no natural affairs, neither public nor private, shall be brought up in this Church, so as to disturb the peace of it. And if any person or persons shall bring up any natural affairs, either public or private, so as to disturb the Church, and being called to order by the Church shall not comply therewith,—the reckoning shall be paid, *and the Church leave the room, and leave the disturbers of it to themselves;* and if any money shall be above the reckoning, the said money to be put into the Closet and spent the next meeting." O sensible Church!

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* *The Post-Boy Robb'd of his Mail*, 2nd Edition, 1706, p. 425.

† *Dictionary of All Religions*, by Hannah Adams, [U.S.A.] Edited by T. Williams, N.D. [1823.] Art. Muggletonians.

There was a book-closet belonging to the Society, for the safe custody of which, at the inn which formed their place of meeting, they paid a certain rent. Otherwise they had no local habitation as a Society, up to last year, 1869; now, however, a new era in their history has been begun, by their acquirement, for the first time, of a home which they can call their own. The place of meeting at present held on lease by the Muggletonians of London and the vicinity, is a small house, in New Street, off Bishopsgate Street Without. This New Street, which was considerably widened some years ago, is specially interesting to the community, inasmuch as they believe it to occupy the same site as Walnut Tree Yard, in which Lodowicke Muggleton was born in 1609; and it is possible they may be right. Their meeting room is on the first floor, and might, at a pinch, hold seventy people; on the floors above and below it are dressing and cloak rooms, and the apartments of the keeper. Beside the fire-place in the meeting room hangs the full length portrait of Muggleton by William Wood; and between the front windows is placed the following inscription:

THIS TABLET
Was erected on the 16th Day of May,
1869,
To commemorate the opening of the
NEW READING ROOM,
No. 7, New Street, Bishopgate. But more
especially to denote the place as formerly called
WALNUT TREE YARD,
WHERE THE LORD'S LAST WITNESS WAS BORN.
ALSO,
To record the names of a few of our
Christian Brethren, who, as believers in
THE THIRD COMMISSION
declared by
JOHN REEVE & LODOWICK MUGGLETON,
have greatly aided the Church, & partly
endowed the present building.

BENEFACTORS.
Catherine Peers,
John Gandar,
Joseph Gandar,
Joseph Frost,
Isaac Frost.

TRUSTEES.
James P. Smith,
Wm. Cates,
J. D. Aspland
Isaac Frost, Jr.

Here, on the evenings of the 14th, 15th, 16th of February last, the believers assembled; never to the number of more than forty, nor more than twenty-five men at one time. Of those present only one-fourth, it was said, were born in the faith. Their business was to converse, take a meal together, and sing selections from the Divine Song Book. On the first evening the proceedings opened with tea, about five o'clock. About six, the Commission Song ("Arise, my soul, arise!") was sung, not by all the company, but by a lady who volunteered to do so. Then came in a large bowl of port wine negus, with slices of lemon floating upon its surface, and the believer whose seniority entitled him to take the lead in the proceedings (there was no chairman) gave, "Our usual toast—absent friends, and all the household of faith wherever they may be." The negus was conveyed into wine glasses by means of an antique silver ladle, the gift of a former believer (who bore the appropriate name of Mr. Thomas Spooner). When it had been handed round, more songs were heard; each person who chose volunteering to sing one. None of the airs were sacred, with the single exception of the evening-hymn tune, which had a very discordant sound as applied to a production of Boyer Glover's, beginning, "Oh! wondrous, great, amazing, strange." In about an hour, beer was brought in, but few partook of it; and by half-past eight supper was ready. It was a plain, substantial meal; consisting of a round of beef, a ham, cheese, butter, bread, and beer. Throughout the evening, every one seemed heartily to enjoy himself and herself, with no lack of friendliness, but with complete decorum. No speeches were made, but between the songs conversation became pretty general. By ten o'clock all were on their way homeward.

It is not necessary to describe the programme of two subsequent evenings, which very closely resembled the opening one, except that the negus was omitted, and the time occupied was shorter. At the breaking up of the Holiday on Wednesday evening, a very short speech was made, or rather a few words were said, by one of the principal members. He referred to the fact that this was their 218th Anniversary, and the first occasion of its being held in a room of their own. He referred also to the fact that, for the first time in their history, a stranger had been permitted to attend their February Holiday, and paid the present writer the compliment of saying that he thought there had been no harm done, and that the experiment might safely be repeated.

One virtue, if it be a virtue, the modern Muggletonians seem to have nearly lost; the virtue, namely, of passing sentence of damnation upon their fellow creatures. In the prophet's days it was regarded almost as a duty, certainly as a mark of faith, and a means of strengthening faith, for private believers to pass this sentence in proper cases.* There were only two limitations to the exercise of the power; one was, that Muggleton himself reserved the privilege of taking off, or ratifying, as the case might be, the sentence which any of his followers had imposed;† and the other was, that "if a man give sentence, and afterwards doubts, that sentence returns on a man's own head, and the party so sentenced is freed from the power of his curse."‡ Accordingly there are well authenticated instances of the use of this power by Muggleton's favourite daughter Sarah, by his wife, by his friend Dorothy Carter, and by many other believers not specified by name. In the internal controversies of Muggletonians during the last century it was a weapon frequently resorted to as an ultimatum. That it is scarcely heard of now, is due partly to the peace and quiet presently enjoyed by the body, and partly to the influence of modern ideas even upon this conservative little community. The same influence shows itself in an opinion, which is now tolerated, respecting the number of the lost. John Reeve, who was once a Universalist, going to the opposite extreme, expresses himself as "fully satisfied that there is a generality of men and women . . . . ordained to an estate of unbelief . . . . that they might everlastingly perish."* He charitably held, however, that all children without exception will be saved.† Muggleton, who in 1662 declared that "the greatest part of mankind" are the seed of the serpent, yet considered, in 1665, that half the world would be saved, counting children, and half would prove reprobate.‡ Notwithstanding this, the present writer has been informed, by a much respected member of the body, that in friendly talk upon the subject with a fellow believer of more conservative tendencies than himself, his friend held that very few would be saved, while he on the contrary believed that very few would be damned; and he expressly ascribed his own view to the influence of modern opinions upon the subject.

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* *Spiritual Epistles, ut supra*, p. 340.

† *Acts of the Witnesses, ut supra*, p. 144.

‡ *Spiritual Epistles, ut supra*, p, 340.

The present writer has indeed seen and conversed with a sensible Muggletonian, who yet was bold enough to pass the damnatory sentence upon an unfortunate Swedenborgian lecturer; but the majority of existing believers would probably never think of following this example. Among the last instances of the formal delivery of this sentence in writing, is that of the Author of Waverley, who was sentenced under that title by the late Robert Wallis, on the 18th July, 1826, on account of offensive expressions in the novel of Woodstock, which speak of "those Grindletonians or Muggletonians in whom is the perfection of every foul and blasphemous heresy, united with such an universal practice of hypocritical assentuation, as would deceive their master, even Satan himself."[*] The latest case of all is perhaps that of the notorious Richard Carlile, who in his coarse way had made much game of the little sect, telling them "though they have no priests, they stand in much need of a schoolmaster," and indulging in sundry unmannerly jests respecting members of the body in Nottingham. At that time Joseph and Isaac Frost were living, and they jointly passed the sentence on him by letter.[†]

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* *Stream from the Tree of Life*, *ut supra*, p. 52.

† *Divine Looking Glass*, 3rd Edition 1719, p. 155.

‡ *Interpretation of Eleventh Chapter of Revelation*, p. 23. *Spiritual Epistles*, *ut supra*, p. 180.

The works of Reeve and Muggleton are the following, enumerated here in the order of their publication.

Transcendent Spiritual Treatise, 1652.
General Epistle from the Holy Spirit, 1653.
Remonstrance from the Eternal God, 1653.
Divine Looking Glass, 1656.
Joyful News from Heaven, 1658.
Interpretation of Revelation, cap. XI., 1662.
Neck of the Quakers' Broken, 1663.
Letter to Thomas Taylor, 1664.
Interpretation of Whole of Revelation, 1665.
Looking Glass for George Fox, 1668.
Witch of Endor, 1669.
Answer to William Penn, 1673.
Acts of the Witnesses, 1699. *Written*, 1677.
Sacred Remains, 1706. *Written*, 1652–1657.
Occasional Discourse, 1719. *Written*, 1668.
Answer to Isaac Pennington, 1719. *Partly Printed*, 1669.
Spiritual Epistles, 1755. *Written*, 1653–1691.
Stream from Tree of Life, 1758. *Written*, 1654–1682.
Supplement to Book of Letters, 1831. *Written*, 1656–1688.

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[*] *Woodstock*, 1826, vol. 3, p. 205. Sir Walter evidently had in view, not Muggletonians, of whom he knew nothing, but Familists.

[†] See Carlile's publication, *The Lion*, ii. 13, and iii. 9.

THIRTEENTH ORDINARY MEETING.

Royal Institution, 18th April, 1870.

JOHN BIRKBECK NEVINS, M.D., President, in the Chair.

Before the business of the Ordinary Meeting began, the Members present formed themselves into an Extraordinary Meeting of the Society (pursuant to notice), when the vote of £5 to the *Sars Subscription Fund* was confirmed.

Mr. T. J. Moore brought before the Society some rare specimens of crustacea, from an elevated lake in the island of Anno Bon, and specimens of fish from the coasts of that island, all of which had been obtained by Mr. R. B. N. Walker, Corresponding Member of the Society, and presented by him to the Free Museum, where they had arrived within the last few hours. Mr. Moore stated that a small living electric fish (*Malapterurus*) had been lately presented to the Museum by Capt. Robinson, of the barque *Elgiva*, imported by him from the West Coast of Africa.

The Rev. H. H. Higgins exhibited a remarkable *pupa*-case, presented to the Free Museum by Mr. Wm. Joynson, who had obtained it at Bombay. The insect forming the case had strengthened and protected it, by completely encircling it with strong thorn-like bodies, shaped like needles, and quite as sharp, and from two to three inches in length.

The following Paper was then read.

EMIGRATION OF ORPHANS.

THAT THE ORPHANS BROUGHT UP AT OUR ORPHAN INSTITUTIONS OUGHT TO BE INDUCED AND ASSISTED TO EMIGRATE TO OUR COLONIES, INSTEAD OF BEING PROVIDED WITH SITUATIONS IN THIS COUNTRY.

By JOHN W. HAYWARD, M.D., M.R.C.S., L.S.A.

IT may have been thought by some, Mr. President, that this subject is not of so much importance or interest to the members of this Society that it should occupy an evening: I, however, cannot think so, for inasmuch as it is a part of the great question—What shall we do with our poor? it appeals as well to the intellectual, the moral and the social faculties; to the pockets and to the hearts of the whole population, and especially of philosophers and philanthropists.

And, moreover, the emigration of our surplus population, and the disposal of our public orphans, have really become two of the great questions of the day. The subject of Emigration has even been brought before the present session of Parliament; and it is creating great interest throughout the country; and philanthropists are endeavouring, by the formation of emigration clubs, societies, and leagues, to assist to relieve our over-stocked labour markets. And the emigration of our public orphans has not only become a great social question, but has lately been put to the test of practical experience, especially by this town: only a short time ago the steamer Hibernia sailed from this port for Canada with quite a number of orphan girls on board, in age ranging from six to ten years: of these, fifty were from our own Industrial Schools, and the rest were from London, Wolverhampton and other large towns. And Mr. Cropper remarked, in reference hereto, that "this was merely the beginning of a large system of emigration of these children." This, I trust, will prove to be true; for so evidently does it appear to me to be the duty of the authorities to these public orphans and to the public, and so evidently is it to the advantage of these orphans themselves, to be induced to emigrate, that I trust this subject will soon be taken up quite earnestly, not by parish authorities only, but by the supporters of the various orphan institutions also. And if the following facts and arguments shall contribute to the hastening of this very desirable result, I shall consider myself amply repaid for the labour of preparing them.

The term 'orphan' means children who have lost one or both parents. And for the convenience of referring to them, orphans may be divided into two principal classes, viz., PRIVATE orphans, or those brought up by their own relations; and PUBLIC orphans, or those brought up by public money. And each of these two principal classes may be again divided into two subdivisions—the PRIVATE orphans may be subdivided into, *first*, those for whom a provision for after life either has been made by their parents or can be made by their relations; and, *second*, those for whom no such provision has been or can be made, because to bring them up and educate them is quite as much as their relations can do: PUBLIC orphans may be subdivided into, *first*, those brought up by parish authorities; and, *second*, those brought up by the various charitable institutions.

It is to *public* orphans and the disposal of them I desire to draw the attention of the society this evening, or at least to the disposal of those brought up at our Orphan Institutions. *What is it best to do for and with public orphans? How shall we best serve them and dispose of them?* These have always been, and they still are, unsettled questions: and it is to the discussion of these questions I now invite this Society.

In all ages, and in most countries, orphans have elicited more sympathy, perhaps, than any other individuals of the human family: and it is well that it should have been so; for of all human beings, not crippled or diseased, orphans are most in need of sympathy and assistance, and most deserving of them. Our own age and country are not behind other ages and countries in this care and provision for this helpless portion of our population: and our own 'good old town of Liverpool' will compare favourably with any other town in this respect; for besides the three workhouses and the industrial schools, in each of which there is ample provision for orphans, there are, at fewest, seven institutions devoted solely to the reception, education and bringing up of public orphans, viz., five Protestant and two Roman Catholic Orphan Institutions. And these are maintained by voluntary benevolence, at a cost of about £15,000 a year, exclusive of the amount of the interest on the cost of the land and the buildings. And they give accommodation, at the present time, to about 1,100 children, most of whom have lost *both* parents. And besides these, many of our orphans are provided for elsewhere; for instance, in the Masonic Orphan Schools, the Commercial Travellers' and the Medical Orphan Asylums, Müller's Orphanage, and others; each of which receives both orphans and subscriptions from this town.

Of *Parish* Orphans there are, at the present time, in the Liverpool Workhouse about 350, in the Toxteth Park Workhouse about 260, in the West Derby Workhouse about 110, and in the Industrial Schools about 1,272; making a total of about 2,000 Parish Orphans. And these cost £13 a year each for their mere maintenance and education; and adding to this the interest on the cost of the land and buildings, we have at least £18 a year each; making a total of about £36,000 a year out of the Rates, for the mere bringing up of *Parish* ORPHANS, over and above the cost of the non-orphan pauper children. Now this is a very serious consideration for the Ratepayers, for these orphans are kept in these institutions until they are 15 or 16 years of age; and then a situation and an outfit are provided for them. 2,000 orphans, at £18 a year each until they are 15 or 16 years of age! This is a very tantalising thought for the small shopkeepers and upper artisans, who, by paying rates, assist to support these parish orphans; for they cannot keep their children to school until they are 15 or 16 years of age: the children of many of them have to work for their own living long before they are this age. It is therefore very desirable that these parish orphans should be disposed of at an earlier age: and the ratepayers should hail with delight any such wise and philanthropic scheme as that of Miss Rye, by which these orphans may be disposed of at an average age of eight years. Miss Rye took away to Canada last year 50 of our parish orphan girls, at an average age of eight years; and thereby she saved the ratepayers of this town something like £5,200 on these 50 orphans alone, taking into account merely the cost of their maintenance and education! What a boon it would be to the ratepayers were all our parish orphans disposed of at the same age! And they could be so disposed of by the same means, viz., emigration. But it is not my intention to go so much into the general question of the disposal of orphans, as into that portion of it which has reference to our Orphan Institutions; I will therefore not pursue further the case of parish orphans, but proceed at once to the subject as it affects our Orphan Institutions.

Now, I have gone carefully into this question in reference to our Orphan Institutions, and I have found that there are in the Orphan Institutions of this town at the present time (even exclusive of those in the Blind Asylum and the Deaf and Dumb Institution), not fewer than 1,100 children, most of whom have lost both parents.--There are in the Protestant

Orphan Asylums, Infants 104, Boys 150, Girls 180; in the Seamen's Orphan Institution, Girls 14, Boys 46; in the Blue Coat Schools, Girls 100, Boys 250; and in the Roman Catholic Girls' Orphanage 86, and in the Boys' 170; making a total of 1,100 orphans being brought up at our Orphan Institutions. And the orphans in these institutions are drawn from a different class of the people from that which supplies the parish orphans, for in some of these institutions it is provided that no orphan shall be admitted who is or has been in a workhouse. And they are even selected from this class, for it is also provided that no orphan shall be admitted unless deprived of *both* parents, or who is over ten years of age, or who is diseased, deformed, or even infirm. And most Dissenter orphans are virtually excluded, for in the Protestant orphan asylums it is provided that all those admitted must be brought up in the principles of the Established Church. Hence a very large proportion of the orphans of the class above paupers are really excluded from these institutions; perhaps three-fourths of the whole. Still, even notwithstanding these restrictions, these institutions are quite full, and are not able to admit nearly all that apply: candidates have to wait their turn, and may have to wait for months, or even years; and, besides that, bring much influence to bear upon the subscribers to gain admission at all before they are over age. This difficulty exists because, under the present arrangement, there is not room enough in these institutions. And this want of room has caused a desire to enlarge these institutions; and certainly something should be done, in order that a greater number may be admitted, and receive the benefit of the early training and education afforded by them; either they should be enlarged, or the orphans should be passed through them more rapidly: for my own part, I am greatly in favour of passing the orphans through them more rapidly; for I am convinced that by so doing much more good may be done and many more orphans served, and much better served, with the same funds and the same institutions. Let the orphans, in future, be taken out at eight years of age, instead of fifteen or sixteen as they are now, and the present institutions will be nearly large enough to accommodate all the orphans of the town: at all events they will be able to admit more than twice as many as they now do, and confer a much greater benefit on these greater numbers than they now do on the smaller; and the children might be received at an earlier age.

To make provision for 120 orphans each year under the present arrangement, children cannot be taken in at an earlier age than four years, except in the Infant Orphan Asylum: in the Blue Coat Schools they are not received younger than eight years. Receiving them at four under the arrangement I propose, 275 would be provided for each year; or receiving them at three, 220; or at two, 183 would be provided for each year by the same institutions and with the same funds; besides the very great advantage to the orphans themselves of being received at an earlier age. Now all this could be done by inducing them to emigrate: but, I confess, I do not know any other means by which it could be done.

From very careful enquiries, I am convinced that a much greater number of the orphans of the class above paupers are left to be brought up by their own relations than are brought up by these seven institutions; in fact, at least three times the number; for we may safely estimate the number of orphans of the class above paupers in this town at the present time to be nearly 5,000, say 4,400. Now, of these, only 1,100 are being brought up in the orphan institutions. In the three Protestant Asylums they are received, the Infants from three weeks up to seven years, the Boys from seven to ten, the Girls from seven to eleven, and there are in them, 434. In the Seamen's Orphan Asylum they are received from six to twelve, and there are in it, 60. In the Blue Coat Schools they are received from eight to twelve, and there are in them, 350. In the Roman Catholic Girls' Orphanage they are received from five to ten, and in the Boys' from four to ten, and there are in them, 256: making a total of 1,100, out of the 4,400 in the town. Now, how are the remaining 3,300 being brought up? I think that we may safely assume that they are being allowed simply *to grow* up until they are able to go to work; and that they get very little education; and that they have scarcely any other prospect before them than that of servants, dressmakers, shop-girls, errand-boys, porters, labourers, or common sailors, or at best office-boys or artisans. It is at least quite certain that they cannot be kept at home, or at education, until they are fifteen or sixteen years of age, as are those who are fortunate enough to get into an Orphan Asylum. I say 'fortunate' enough to get into an Orphan Institution, for it is really a piece of good fortune to these 1,100; for they are comfortably housed, and well fed, educated and clothed for nine or ten years of their lives, and after that an outfit and a respectable situation are provided for them; and this, over the heads of, in preference to, and even to the exclusion of the same number of the remaining 3,300, whose friends have borne all the expense and responsibility of bringing them up! During last year, there went out of the Protestant Orphan Girls' Asylum, 14; from the Boys', 18; from the Blue Coat Schools, girls 10, boys 50; and from the Roman Catholic Orphanages, 28; making a total of 120 orphans, passed through these orphan institutions during the year, at an expenditure of £15,000. These were very small results, it must be confessed, for so much money and labour. Surely this shows something wrong in the management! Surely such institutions and such funds ought to produce larger results! £15,000 were expended in one year to provide for

120 out of the 4,400 orphans, whilst 3,300 were left without any assistance at all! Surely such should not be the case; such a sum of money ought to provide for more than 120—ought to be more equally distributed among the 4,400, or at least ought to be extended to a much larger number of them! Are there no means of doing this? Certainly there are:—Let the orphans, as before stated, be disposed of at an average age of eight years, as were those taken out by Miss Rye, and the thing would be done; for 275 would be provided for each year. Under the present arrangement, 1,100 orphans are being brought up in these institutions: of these at least 800 are over eight years of age. By disposing of them at eight years of age, therefore, 800 would be disposed of at once, and would make room for 800 fresh ones. What a boon this would be to many poor families, now struggling to bring up the orphan children of their deceased relatives! By disposing of the orphans at fifteen or sixteen, 120 are admitted and 120 are disposed of each year. By disposing of them at an average age of eight years, 275 would be admitted and 275 disposed of each year; or if admitted one year earlier, 220; or two years earlier, 183; and so on according to the age of admission, by the same institutions and by the same funds.

Now, the *situations* into which the orphans brought up at our orphan institutions are put are, the *girls* almost exclusively that of *domestic servants;* some few go as shop-girls, or to businesses, or trades: the *boys,* most of them, are apprenticed to offices, for *clerks;* some to trades or businesses. Now, there is some difficulty in getting such situations for these children, for these are just the situations for which there are always vastly too many candidates, even without these public orphans: and they are also, in a sanitary point of view, very unsuitable situations for orphans, probably more unsuitable ones could scarcely be selected: it would indeed be very much better for the health of the orphans were they put to agricultural pursuits, by being induced to emigrate to the Colonies on leaving the institutions.

I. As to the Girls:—The girls are kept in the institutions until they are sixteen years of age, and then they are apprenticed out to mistresses for three years, that is, until they are nineteen years of age; and then they are free, and have to do for themselves.

Now, we all know that there is not only no lack of domestic servants, such as they are, but that there always is and always will be, not only enow, but too many of them, even without these public orphans. To add, then, these public orphan girls to the class of domestic servants, is only to increase the evils of over-supply. The great difficulty as to domestic servants is, not that they are too few, but that they are unfit for the position; that they are untaught, or improperly taught, the duties and requirements of domestic life: and in this respect the girls brought up at our orphan institutions are not a bit better than the rest. And we all also know the very unenviable position the female domestics occupy, and the many temptations and degradations they have to submit to, and the miserable end to which many of them eventually come. This is certainly not a position to be coveted by our public orphan girl, nor one into which she can be put as a favour: it keeps her in a country in which there are already vastly too many of her sex, and condemns her to almost certain celibacy all her life. It would be otherwise were it not for over-supply. A thousand times better would it be for the public orphan girls were they induced, on leaving the institutions, to emigrate to the Colonies, where women are too few and are urgently wanted; and where there would be every prospect of their becoming, not servants but mistresses, not old maids but wives and mothers; and where the total change of climate and the more free and natural mode of life would conduce to the removal of their natural, inherited, weakness of constitution.

Now, black as is the picture I have drawn of the position of the female domestic, the position of the women connected with work-rooms, shops, business houses and trades is, if possible, even worse; similar remarks are equally applicable; indeed the position of these is simply dreadful: here the evils of over-supply are painfully evident and grievously felt; and have more than once called for the interference of Government. It is as Hood said:

> "Work, work, work!
> My labour never flags;
> And what are its wages? A bed of straw,
> A crust of bread—and rags.
>
> Stitch—stitch—stitch,
> In poverty, hunger, and dirt,
> Sewing at once, with a double thread,
> A shroud as well as a shirt."

II. As to the Boys:—Great difficulty is experienced in finding situations for the boys brought up at our orphan asylums, so much so that the committee have continually to appeal for assistance in this matter: in their report for last year, they say: "The difficulty of finding suitable situations for the boys is still encountered, and any assistance in this matter would be much esteemed by the committee, as enabling them, by the creation of vacancies, to admit children now on the books more rapidly than it is at present in their power to do." This is to be regretted; but it is certainly not to be wondered at, when we take into consideration the circumstances of the case; for of all situations desirable clerkships offer the fewest openings for orphan boys, because there is always a long list of other candidates waiting for the vacancies as they occur. "Here, in Liverpool," says the writer of *Porcupine*, "ninety-nine parents out of the hundred have but one idea in respect of embarking their lads in life, and that is a high stool in a merchant's office." There are in this town about 20,000 clerks, and of these about 5,500 are apprentices; and these apprentices have to serve at least five years; the vacancies, therefore, cannot exceed about 1,100 a year: now there are many more than 1,100 candidates for them, even without these public orphans; there are indeed nearly 2,200 candidates; and some of these are of course much more entitled to them than others are, and some have a much better chance of getting them than others have: in these respects these candidates may be divided into six different classes, viz., — 1, And most likely to get the best situations, the sons of the merchants themselves: 2, And next likely to get the best, the sons of the present clerks: 3, The present existing office-boys, and many of the unemployed elder clerks, who are driven to be willing to accept boys' situations rather than to starve: 4, And most entitled to at least the second or third class of these situations, the destitute orphan boys brought up by their own relations: 5, And next entitled, the children of the small shopkeepers and respectable artisans: and 6, and least entitled, these orphans brought up at the public expense.

Now there are, as I have before stated, 120 children passed through our orphan institutions every year; of these 87 are boys, and, as before said, the majority of the boys are candidates for the clerkships, say these amount to about 80; then we may safely estimate that there are 100 sons of merchants; 400 eligible office-boys; 400 sons of clerks; 300 private orphans; and at least 900 children of small shopkeepers and respectable artisans; making a total of nearly 2,200 competitors for 1,100 situations! Can we then wonder at the great difficulty there is in obtaining these situations?

And do we not see the great mistake of bringing up public orphan boys with the expectation of becoming clerks? Can we not see that it would be infinitely better for them, and for all parties concerned, to induce them to emigrate to the Colonies on leaving the institutions?

Then the remuneration of apprentice clerks is so miserably small, that most of them have to be kept almost entirely the whole period of their apprenticeship. Of course the sons of the merchants themselves will take these situations for the mere advantage of learning the routine of office, to prepare them to take their fathers' places when they retire; and the office-boys will of course accept the position for even their wages: and I have been credibly informed that in the offices of some of our merchant princes, there are from five to ten apprentices, who merely receive a sum varying from £25 to £100 at the end of their apprenticeship, and are then turned out to make room for others at the same remuneration. Such remuneration is surely not what we would desire for the boys of our orphan institutions, from the fifteenth to the twentieth year of their age! And to contend that these orphans, through the influence of the subscribers, are better treated than I here indicate, would only aggravate the evil of which I complain; for such favoritism would be another injustice to the other candidates.

Then the position of a clerk after he has served his apprenticeship is certainly not, in the majority of cases, to be envied. Speaking of the lads put to clerkships, the editor of *Porcupine* observes: "Assuredly they do not prosper: the great bulk of them are lost in hopeless obscurity." Of more than half of the clerks of this town the salary is only £100, or under; so that an apprentice must possess very good qualities and abilities to entitle him to expect more than £100 a year for many of the first years of his life. A writer in the *Daily Mercury*, the other day, said: "Our clerks, now-a-days, consider themselves very lucky if they fall in with a situation at £60 per annum." Only a short time ago I read of a man, of some education, who had most of the work and all the responsibility of an office, and kept the situation for four years, for the miserable pittance of 7s. a-week! This would not be the case, however, were it not for the immense over-supply; for it is not because the clerks are not worth more, but because if one will not take the situation for this miserable pittance another will. Very few indeed of our clerks can afford to bring up a family at all respectably, and a very large proportion of them dare not even think of getting married, because it would be simply folly to attempt to maintain a wife and family on their miserable earnings. Hence they are driven to contribute to the maintenance of one of the crying evils of our day, viz. Prostitution; and thus also run the risk of disease and disgrace. Natural instinct, at times uncontrollable, drives them to commit this sin: and this is frequently the beginning of their fall and ruin; for they, becoming disgusted with themselves, try to drown their remorse with drink; and, shunning the society of the moral and virtuous, they seek that of the immoral and depraved; they neglect their duty and lose their situations; and thus, step by step, they are driven to ruin.

Then, again, even with clerks of good character, there is immense difficulty in getting a re-engagement when once a clerk gets out of employment. Of the 20,000 clerks in this town, I am credibly informed there are always from 300 to 400 out of employment, some of them for many months at a time. Now what can they do for a living during this time? Certainly they cannot live on what they have accumulated from their previous earnings. And are not many of them thus forced into the class of criminals by mere want? To avoid ruin, many of them have to take up some other occupation, or to emigrate at last, after having wasted their youth in an occupation that will not only be of no use to them, but will, more than any other, have unfitted them for that employment which, as emigrants, they must necessarily adopt. And are not many of them tempted to embezzle the means for emigrating? Certainly it would have been much better for these young men had they emigrated in their youth, for by this age they would be independent and free, if not wealthy. Why should we thrust poor helpless public orphans into this struggling, starving, over-crowded class? It is certainly no great kindness to them to do so; indeed if we would render them a service, we shall do all we can to keep them out of clerkships. It would be very much better to induce them to emigrate to the Colonies, where there is plenty of room and abundance of work, and not only no risk of starvation but every prospect of plenty and prosperity, and every inducement for them to marry and to live morally, and rejoice in the responsibility of a family of children.

Of course there are some very comfortable, lucrative and desirable clerkships; but there are also many fit and worthy candidates waiting for them, and to most apprentices they are rather things to be hoped for than expected.

Now these remarks I have made with reference to clerkships, gloomy as they are, are almost equally applicable to businesses and trades in this country. The facts may be shown to be similar in each case, and that a similar scarcity of employment and surplus of candidates exist in each, and are productive of similar evils. Apprentices to trades in this country have in many cases to work for a term of years and be kept all the time by their friends; and even after they are out of their time they cannot obtain a situation that will keep them; so that many of them are compelled to emigrate even after serving an apprenticeship. And here comes a great evil for this country, for those who do emigrate are, generally speaking, the most skilled, robust and enterprising of them.

This country therefore loses by emigration a vast number of its most promising adult artisan and labouring male population. I have not been able to get the account for the whole year, 1869, but during the last quarter at least 31,190 such emigrants left this country; 16,762 of these were English, 10,305 were Irish, and 4,123 were Scotch; taking these numbers as the average, the number for the year would be 124,000, say 120,000; in 1868 the number was 138,187; and in 1867 it was 156,982, so that even 124,000 would be under the mark rather than over. And these emigrants did not much benefit our Colonies, for five-sixths of them went to the United States.

In a country like England, and especially a town like Liverpool, emigration is a necessity; for there is not, and there cannot be, remunerative or desirable employment for the whole population; some must emigrate. The questions, therefore, arise—Who shall emigrate? and Whither shall they go? My answers to these questions are:—Women and Orphans; and to our own Colonies. Our present system of emigration is certainly very faulty, for by it we lose those we ought to retain, and retain those we could well spare; and they go especially to the United States, instead of to our own Colonies. Now we have a surplus of women, and this surplus can neither be married nor honourably employed; and our Colonies have a paucity of women, and the men can neither get wives nor get women to do women's work; girls, and even adult women, should therefore be encouraged to emigrate; and nearly *all orphans* should emigrate, for they have fewer family ties than others; and especially the orphans brought up by public charity; PUBLIC ORPHANS, therefore, are of all persons the ones who should emigrate; and emigration should be suggested to them, and its advantages to themselves pointed out to them. *Indeed it should be one of the rules of all Orphan Institutions, that all those, both boys and* *girls, who are educated and brought up by their funds will be expected to emigrate eventually.* This should be an absolute condition of their admission. These institutions would then serve two very important and useful purposes which they now do not serve, viz., they would supply needed population to our Colonies, instead of aiding to supply it to the United States, and they would assist to preserve to the Mother Country much of the skill, enterprise, bone and muscle that are now forced away; whilst they would be prevented from assisting, as they now do, to increase the evils of over-supply in our labour markets. Some persons may object to such a rule being adopted by our orphan institutions, and may even think such would be unjust; but surely there would be nothing unjust in benefactors making any reasonable condition as to the distribution of their charity, especially if such condition would be to the advantage, not only of the recipients but of the country and all concerned! Such a rule would be no injustice, but wisdom and foresight; and it would apply, not to those already in these institutions, but only to those who would enter under this condition.

That emigration would be an absolute kindness and an immense advantage to the public orphans themselves will, I think, appear evident on reflection; for, besides the facts before mentioned, and which I need not here repeat, we must consider their inherited constitutional weakness; and their prospects in this country. As to their constitution: being born of weakly and sickly parents, who had not stamina enough to keep them alive to bring up their children, many of them are consumptive from birth, or have inherited some other constitutional taint tending to carry them to an early grave; for this a total change of climate is one of the best curative means, and this they would thus get free of expense to their friends. Then as to their prospects, as clerks: a closely-confined, ill-ventilated, unhealthy and perhaps damp office, with long hours and short pay; and, as apprentices to businesses and trades, having neither money nor friends to set them up in business, they must spend their lives as assistants; whilst their small stature and unprepossessing appearance, and their want of vigorous health, would exclude them from the best of these assistancies; they would thus be condemed to a poor, miserable and degraded position all their lives. If they live, they perhaps marry, and raise up, in poverty, offspring little better than themselves; and they themselves drag out a miserable existence, half on duty and half on the sick list of their clubs; with poverty, sickness and an early death constantly staring them in the face. Emigration in youth would be to them an immense boon, both physically and socially; it would give them the invigorating influence of a total and suitable change of climate, and it would change their sickly, degrading and unremunerative occupation to a healthy, honourable and lucrative one; and their prospects from a miserable starvation pittance to comfort, competence and independence. I need say no more, I think, or I would enlarge on the vast resources of our Colonies, their extent of territory and their productiveness, which only wait for occupation and development.

Then, that early emigration of the public orphans would be an immense advantage to the Mother Country will be admitted by all. As before stated, some must emigrate; our population is too numerous for our lower middle and our labouring classes to live in comfort and prosperity; our natural increase is too rapid for the resources of our country, and the evils of this fall very heavily on our labouring population. Voluntary emigration of our surplus population takes place at the rate of about 120,000 to 130,000 annually; and these are drawn principally from the adult male population, and particularly from the healthy, strong, vigorous and skilled artisans, who scrape together all they have and take it away out of the country. Thus those emigrate that we can *least* afford to spare, and those are left that we could *best* afford to spare; and those who do emigrate remain in this country whilst they are comparatively useless and have to be provided for, and as soon as they have become useful and able to provide for themselves they go away. Men, of whom we have the fewer, go away and leave the women, of whom we have always an excess; the strong and well-developed, vigorous and healthy, emigrate, and leave us the weak, puny and unhealthy; the hopeful and enterprising go away, and leave us the shiftless and dependent; thus is brought about a degeneration of our race, both physically and mentally, in our own country, and an improvement of it in the United States.

Now much might be done to prevent these undesirable results, by the emigration of our public orphans. There are in Liverpool, under the present arrangement and including the Parish Orphans, about 300 public orphans to be disposed of every year; and taking the same proportion for the whole kingdom there would be 17,300; but under the arrangement I propose there would be in Liverpool alone 775; and taking this proportion for the whole kingdom there would be 42,900 public orphans to be induced to emigrate every year. Thus, then, by inducing our public orphans to emigrate, we should preserve to our country considerably more than one-third of the intellect, enterprise, bone, muscle, skill and wealth, that under the present arrangement we are continually furnishing to the United States; and would relieve ourselves of something like 42,900 persons per annum that we can very well afford to spare; and would, as compared with the present plan, save about £120 on each orphan brought up by public money; so that in future each public orphan would cost us about £120 less than he does at present; and this would be an immense saving to the country, seeing that we have not fewer than 369,000 public orphans in the country; and it would greatly assist to diminish our taxes; to raise the position of our clerks, assistants and artisans; and to improve the physique and intelligence of our population.

And again, that early emigration of our public orphans would be an immense advantage to our Colonies, it needs no argument to show. Our Colonies are greatly in need of increase of population by immigration; because their own natural increase is not sufficiently rapid to take advantage of their immense resources. They require especially women; and youths, of both sexes, who have not settled in one particular employment, but who can be easily adapted to the necessities and resources of the country; not delicate clerks nor skilled artisans, but servants and helpers, young and tractable. And just such an addition to their population the early emigration of our public orphans would supply; and of such we could supply them about 42,900 per annum; which, with the usual proportion of the adult emigrants, would make 64,900 per annum to our own Colonies, instead of only 22,000 as is done at present, This would, of course, be an immense help to our Colonies, and would greatly assist to develop their resources, and to increase their productions, and their imports and exports.

So much for the necessity and wisdom of inducing our public orphans to emigrate. What about the possiblity, practicability and means? for, after all, these are the main questions.

Fortunately, I need not detain the Society long on these points, because they have all been already not only indicated but demonstrated by the benevolent Miss Rye, who last year took out to Canada 70 parish orphan girls, and there provided for them to the complete satisfaction of all parties concerned; thus showing, not only the possibility, practicability and means, but also the way to success. As to the emigration of parish orphans, Government has already legislated: for by the

4 and 5 Act of William IV. Parishes in England and Wales are empowered to raise funds by a yearly rate for this purpose; and the 11 and 12 Victoria empowers guardians to provide funds for this purpose out of the ordinary Poor's Rate; and by the 12 and 13 Victoria they are empowered to expend a sum not exceeding £10 for each person, without calling a previous vestry meeting; and the 13 and 14 Victoria, making special provision for the emigration of orphan children, provides that they shall not be emigrated without at least their own free consent. The powers thus afforded have not been made much use of, because hitherto there has been no proper organisation for the purpose, especially for the reception and disposal of the orphans after they have arrived in the Colony. This want has, however, now been supplied, by an establishment called "Our Western Home, Niagara, Canada West;" and 70 orphan girls have already been passed through it to comfortable situations in Canada; and we need only continue the work so successfully begun by Miss Rye, following in her footsteps, or furthering and assisting her enterprise. Miss Rye proceeded thus: She went to our Industrial Schools, and there asked the orphan girls if they would go with her to Canada: the responses were so generally in the affirmative that she had more volunteers than she could accept, so she selected 50 of those whose relatives consented; and, along with some 20 others from other towns, she took them out in the Hibernia. Their passage money and other expenses were soon provided, partly by private benevolence. She provided every comfort for them on the voyage, and on their arrival in Canada she took them to the "Home," and afterwards into the interior, where such immigrants are much needed for servants, and where they were eagerly seized upon by respectable landowners; so that within a couple of months she had found places for nearly the whole number. So successful has been

her mission, that we may soon look for her return; and by that time I hope we shall be prepared to offer her a considerable number more, with less hesitation and more confidence, and with more liberal assistance. The following paragraph I cut from the *Lancet*, of the 9th of April, 1870 :—

> "GUTTER-CHILDREN.
>
> "ENGLAND'S misfortune is Canada's opportunity. Such is the lesson taught us by Miss Rye's philanthropic and useful labours. Of the seventy little orphan girls who under her auspices have found in the far West the home denied to them in the mother-land, her most sanguine expectations (she tells the world through the *Times*) have been more than fulfilled. Their health has been wonderfully good—both doctor and dispenser being themselves dispensed with. They have proved affectionate, obedient, and grateful, and all, especially those from the Kirkdale Industrial School at Liverpool, have turned out capital workers, creditable at once to their teachers and themselves. From "Our Western Home, Niagara, Canada West," Miss Rye appeals to the philanthropically minded of the British public for another party of little emigrants, to be ready for her on her arrival here in April, so as to accompany her on her return at the end of May. Upwards of a hundred homes are waiting for them; and their protectors here may be assured that, as on the voyage out, so on their arrival, they will receive every attention that kind hearts and able hands can bestow. It were idle to calculate the boon conferred on England by the rescue of these orphans, and their entrance on a useful and virtuous life, away from the moral and sanitary risks of our great cities; while to Canada, under-populated as she is, the acquisition of so many young, active, and intelligent females is a bit of good fortune which she cannot fail to appreciate. Young Canadians of the rougher sex own themselves the most immediate gainers by the English exodus, and, doubtless, make pleasant reference to their future helpmates "coming through the Rye."

This inaugurates a new era in our emigration, and one likely to prove beneficial to all parties concerned. Of course young people are the most suitable for emigrants; and it appears from experience that they should be taken out as children, for they are then much more acceptable to the colonists, and much more likely to do well; that they are much more likely to do well if taken out about eight years of age than fifteen years and upwards. And I am led to believe that, with such arrangement as that of Miss Rye, the Colonial Government would gladly bear the whole expense of emigrating any number of eligible orphan children of about eight years of age. At the late meeting of the Emigration League in this town, one speaker, Mr. E. Jenkins, Barrister, London, said: "They had seen the representatives of New Zealand, of some of the Australian colonies, and of Canada; and from one and all they get the same answer, viz., that they were anxious to receive the people of this country, if sent on proper conditions; . . . . and in some cases the Colonial Governments would guarantee that the whole of the money expended in that way should be returned to the Home Government." And Sir George Grey said: "Nearly all the emigrants who had proceeded to Australia and New Zealand, and vast numbers of those who had gone to the Cape of Good Hope, were removed from Great Britain by free passages being granted to them by Colonial Governments; . . . . and that every one of our Colonies would join the Government with the greatest readiness in a matter of this kind, and would receive the emigrants from the moment they landed, and watch over them until they were placed upon lands suited for their purposes, and aid them in every possible way." But even independent of any Colonial assistance whatever, the mother country would be a great gainer by sending out the public orphans at about eight years of age; the poor's rates might be reduced, and the ratepayers relieved wonderfully, for though each parish orphan should cost £20 to send out, we should save at least £100 on each one. And as to the orphans brought up at the institutions, I am sure ample funds would be forthcoming immediately the scheme was set at work. We would thus provide for at least 775 public orphans each year; doing the best thing possible for them, for the mother-country, and for the colonies; and exercising true philanthropy and true social and political economy.

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